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ABSTRACT

A case study of the workers' colleges in China was undertaken by the Central Institute for Educational Research in Beijing and the Unesco International Institute for Educational Planning in Paris. Workers' colleges provide formal higher education for inservice workers with either full-time or diverse patterns of part-time studies, and the study programs are roughly comparable to those in regular institutions of higher education. The survey was conducted in 1983 in 10 workers' colleges. The following topics were examined across colleges: (1) background and training objectives; (2) entrance requirements; (3) size; (4) curriculum; (5) teaching faculty; (6) building and facilities; (7) expenditures; and (8) leadership and management. Analyses tended to show that workers' colleges had played an important role in China in that they are a means of improving the existing labor force through a form of inservice training; are sensitive to real work force needs; provide a viable "second route" to higher education; mobilize local resources; and provide for efficient use of resources. (The report begins with a general description of adult education in China, including at least eight types of recognized adult higher education; the higher education system in China; the complex framework of adult higher education; and workers' colleges in general. A brief statement of recent developments in adult education is included. The report, which included 39 tables, concludes with two appendices. The appendices contain a list of information collected on graduates and a list of innovations introduced by graduates of one workers' college.) (CML)

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Adult Higher Education

A case study on the workers' college in the

by Yu Bo and Xu Hua Yun

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This report, directed by Ta-Ngoc Châu, IIEP, is part of the Institute's research on 'The diversification of the educational field'.

Adult higher education: a case study on the Workers' Colleges in the People's Republic of China

Yu Bo *and* Xu Hong Yan

Central Institute for Educational Research
State Education Commission, Beijing

Paris 1988

Unesco: International Institute for Educational Planning

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Preface

Adult education has always played a very important role in the People's Republic of China both as a means to improve the level of education of the people and as a way to reduce inequality by giving new opportunities to those who have not fully benefited from education.

After the Cultural Revolution, special emphasis was given to the development of higher education through quantitative expansion as well as qualitative improvement. This policy has obviously influenced the various types of adult higher education and particularly the Workers' Colleges which recruit, on the basis of an entrance examination, workers with at least two years' work experience. Those admitted can either be released from work to participate in a full-time course or follow a 'half work/half study' programme.

This report on the Workers' Colleges is the result of a co-operative research project jointly undertaken by the Central Institute for Educational Research (Beijing) and the International Institute for Educational Planning. The design of the research project and of the instruments for data collection were established following detailed preparations with a CIER research team led by Mr. Yu Bo. The survey itself was conducted in 1983 in ten Workers' Colleges located in the provinces of Shanxi, Liaoning and Heilongjiang and in the municipality of Shanghai. In 1985, two researchers from the CIER, Messrs. Yu Bo and Xu Hong Yan, stayed at IIEP in Paris for some weeks to process and analyze the collected data and to identify the main findings of the research.

I wish to express IIEP's gratitude to the Central Institute for Educational Research for its very valuable co-operation and for the resources it mobilized, in order to ensure the successful completion of this research project. The original experience of China in the organization and the development of the Workers' Colleges is of the highest interest. Its example may be of high profit to other countries.

I should like to thank my colleague, Mr. Ta Ngoc Châu, who has worked closely with Messrs. Yu Bo and Xu Hong Yan during their research programme at IIEP and who has contributed significantly to this project. I should like also to thank Mr. Cheng Kai Ming of Hong Kong University

who has carefully edited the manuscript, clarifying many concepts for the benefit of those who are not familiar with the Chinese context.

Sylvain Lourié
Director, IIEP

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Introduction

The education system in the People's Republic of China is perhaps the largest in the world. As in other countries of Confucian tradition, the system of basic education in China is comparatively simple. It always amazes foreigners that such a vast country of over one thousand million people can conform to one unified system of schools, with a unified system of curriculum and textbooks and, until recently, a unified system of public examinations.

In contrast, one can be equally amazed by the complexity in China's education system beyond schools. The complexity is characterized not only by the types of institutions, but also in the modes of studies and the ways of sponsorship. In comparison with other countries, China's adult education operates in a complicated framework. Apart from literacy courses and other primary and secondary level adult education, there is a comprehensive system of adult higher education.

As will be seen later (p. 24), there are at least eight types of recognized adult higher education in China: (i) radio and television universities; (ii) correspondence departments of regular institutions; (iii) evening colleges attached to regular institutions; (iv) workers' colleges; (v) independent study examinations; (vi) in-servive colleges for administrative staff; (vii) in-service teacher-training colleges; (viii) peasants' colleges. 'Regular' institutions are conventional institutions of higher education which offer formal full-time courses for pre-service learning.

This report is based on a survey in China's workers' colleges which was carried out in 1983. Workers' colleges constitute one of the major components of adult higher education in China. In general, workers' colleges provide *formal* higher education for *in-service* workers. By workers are meant members at all levels of industrial units. Such units are often referred to as 'factories, mines and enterprises' in the Chinese literature. Workers' colleges may take the mode of either full-time or diverse patterns of part-time studies. Study programmes in workers' colleges are roughly comparable to those in regular institutions of higher education. Furthermore, workers' colleges operate under a variety of sponsorship.

On the whole, the workers' college is a means of upgrading and retraining the existing manpower, in a way that incurs the minimum loss of productivity and the maximum mobilization of local resources (both human and physical). Yet, it leads to formal qualifications comparable to regular university diplomas or degrees. A study of the workers' colleges in China may prove helpful to other developing countries which have similar needs of rapid improvement of their manpower.

This report starts with a general description of (a) adult education in China, (b) the higher education system in China, (c) the complex framework of adult higher education, and (d) workers' colleges in general. All this background information constitutes Part 1 of this report. Part 2 provides the main body of the study report. The survey, carried out in 1983, looked at ten workers' colleges spread over different parts of the country. In Part 3, a comparison will be made between workers' colleges and other regular higher education institutions. Part 4 concludes the report with a short summary and a brief statement of the developments since 1983.

Broadly speaking, the Chinese higher education system has expanded with extraordinary speed in recent years. The number of conventional institutions of higher education increased from 715 by the end of 1982 to 1,016 by the end of 1985. In the same period, student enrolment in regular higher education increased by 47 per cent from 1,150,000 to 1,700,000. In adult higher education, there was a parallel expansion of 48 per cent in enrolment (from 1,170,000 in 1982 to 1,730,000 in 1985).[1] Among the 1,216 institutions of adult higher education in 1985, the majority were workers' colleges. There were 800 workers' colleges by the end of 1985, having a student population of 260,000, about 15 per cent of the entire adult higher education population.

[1] All the figures can be found in: Department of Planning and Finance, *Achievement of Education in China: Statistics 1980-1985*. Peoples Education Press, 1986 and *Achievement of Education in China: Statistics, 1949-1983*. People's Education Press, 1984.

Part 1
The development of the workers' college as a form of adult higher education in China

I. Adult education in China

A. History and status

The workers' colleges are one of the major components of adult education in China. It is therefore justified to look at adult education as a whole, to examine the framework of which workers' colleges form a part.

Adult education was at one time also called 'worker-peasant' education in China, because most of the five hundred million adults, among the one thousand million Chinese, are workers and peasants. Adult education is often called 'spare-time education', because the adults' study programmes are usually organized and conducted after working hours. The network of adult education in China is constituted by formal educational institutions—adult schools, colleges, training courses—as well as non-formal channels such as radio and television broadcasts, correspondence or independent study. It ranges from literacy programmes to degree courses. There is a multitude of levels and a variety of formats. It is often referred to as a 'multi-level, multi-form' system. Other social and cultural facilities, such as museums, clubs and cultural centres, also contribute to adult education. It may be useful to look at adult education in its historical context.

Adult education has been given an important place since the founding of New China. In 1949, when the new government took over, it was stipulated in a major constitutional document that 'spare-time education of the labouring masses and the in-service education of cadres[2] should be strengthened.' The first national conference on education, held in Beijing in December of the same year, declared:

[2] The term 'cadre' requires some clarification because it occurs very frequently in the Chinese literature. 'Cadres' refer initially to administrators at all levels, but its meaning is much broader than 'administrator' in the Western sense. Anyone who is not at the bottom level of the organizational hierarchy is a cadre.

> "Open the school door to workers, peasants and their children, set up people's universities and workers-peasants' accelerated middle schools, develop worker-peasant remedial education on a grand scale, implement the mass literacy movement on a national scale."

In October 1951, the Central People's Government resolved the general policy of setting up various types of schools for the cadres, for the remedial education of workers and peasants, and of operating other training courses to form intellectuals from among the worker-peasant masses. It stated that 'all working people should enjoy the right to education.' It is clear from this statement that the major target groups of adult education in China include cadres, workers and peasants. The Constitution of the People's Republic of China, established later, also called for the development of adult education in diverse forms 'to raise the political, scientific and cultural levels of the working people'.

The normal development of adult education underwent some disruption during the Cultural Revolution (1966-1976). Some form of adult education, however, emerged in the form of 'July 21' worker universities (to be explained later, see p.30), and in the form of 'May 7' peasant universities and adult political evening schools.

In 1979, education policy was reformulated and adult education was again given a high priority. Since, there has been a call for the retraining of cadres through various educational means, such as short-term courses, in-service training in different 'administrative staff training institutes' or special training courses attached to institutions of higher education. Workers' education has been stressed as "an essential means to develop qualified manpower" and as "a guarantee to the continued development of the national economy". As far as peasant education is concerned, the emphasis has been on the elimination of illiteracy, as "an important foundation of agricultural modernization".

In addition to these general guidelines, detailed policies and measures were deliberated by the responsible authorities both at central and local government levels. It has to be noted that in China, education is not only the responsibility of the then Ministry of Education.[3] Various non-educational ministries also operate education and training programmes to cater for their own manpower needs. At local levels, education is not only taken care of by the government education departments, but also by education components (e.g. education bureaux) in non-educational departments.

[3] The Ministry of Education has been restructured and has become included in the newly established State Education Commission which is a cross-ministerial high power commission.

B. Organization of adult education in China

As mentioned above, adult education in China is a vast field characterized by its multitude of levels and diversity of formats. There are various organizers of adult education. Central government ministries and local government departments may directly operate adult education through, for example, radio/TV schools and colleges or cadre schools. They may co-operate with established higher education institutions to run independent-study examinations, training courses for the cadres, or correspondence or evening colleges. Some of these may be endeavours of the institutions alone. Rural villages or townships may run peasants' cultural schools or technical schools. Factories, mines and other enterprises may operate schools, colleges or short-term training courses. The Communist Party, other non-communist parties and community agencies all contribute in sponsoring adult education institutions.

As far as the aims and objectives are concerned, there are spare-time primary and secondary (junior and senior) schools which aim at eliminating illiteracy and spreading education, and there are institutions at secondary and tertiary levels aiming at the training of qualified manpower in technology or management. If we classify by modes of study, there are three types of educational programmes. There is the 'off-job' mode where the student is released from work to do full-time study. There is secondly the so-called 'half working, half studying' mode in which the student works and studies according to a specific time-table, for example, working and studying on alternate days or in alternate sessions of the same day. The third mode is the 'spare-time' study which takes place entirely after working hours. The complexity in the system of adult education reflects the large range of goals and varied conditions of study among the adult learners.

C. General guidelines

The following are the principal guidelines that are largely followed by organizers of adult education in China.

1. Compatibility with production

The distinctive nature of adult education in China is determined by its participants—adult workers and peasants who constitute the essential component of the nation's productive forces. On the one hand, the learners have to work and study simultaneously, and have to face quite heavy housework at home. The time and energy that they can devote to study is limited. On the other hand, there are the basic objectives of popularizing science and technology and the training of qualified manpower. Adult

education is often viewed as a means of human resources development. Production administrators are supposed to include plans for adult education in their production plans.

2. Mobilization of non-government resources

Adult education is regarded as a mass educational undertaking in China. With a population of over one thousand million and relatively limited resources, the State is unable to run the whole adult education system by itself. There is heavy reliance upon the voluntary support of non-government organizations.

Schools for workers' education in cities or enterprises rely heavily on labour unions and enterprises to finance and staff the schools.

The schools for peasant education mainly depend on townships, villages and other economic units which mobilize the peasants to build and equip the schools and select among them those who are able to teach. The government does provide minimal funding. This is usually used for compiling and printing study materials and the training of teachers. Sometimes, a part of the government funds are used as a bonus or prize for outstanding teachers, students or operators of adult education.

In addition, a large number of community organizations, such as the Communist Youth League, the Women's Federation, the Militia Organization, the Association for Science Popularization, as well as educational institutions at different levels, all take active part in adult education.

3. Integration of theory with practice

The primary aim of adult study is the application of what is learned to real practice, to improve the ability to analyze and solve problems. The slogan is "study for the purpose of application, combine theory with practice". This is no mere slogan for propaganda. It reflects to a large extent the real incentive which motivates the adults to learn and the various agencies to sponsor adult education.

As a matter of consequence, the curricula and programmes taught in adult education are often closely related to what is urgently needed in the students' work. This course of action is usually called "learn what is happening, replenish what is lacking".

4. Competence-based instruction

This principle is closely inter-related with the one mentioned above. The study conditions, requirements, aims and interests of the adult students vary immensely, with the result that the organization of adult education is intricate: students opt for different disciplines, different modes of study and possess very different educational backgrounds. Adult education

programmes are seen to be efficient and effective only if they lead to practical competence after study.

D. Administration of adult education in China

There are basically two levels of administration. There is the centralized leadership where the Central People's Government, comprising the State Education Commission (formerly the Ministry of Education) as well as other non-educational ministries (we shall call these the production ministries), are in charge of (a) formulating the guiding principles and basic policies, (b) drafting and issuing the instruction syllabuses, (c) approving and monitoring the operation of adult higher education institutions, and (d) co-ordinating the relevant ministries and sectors concerned.

The local governments are responsible for the actual management of adult education. This includes (a) the establishment of schools, (b) distribution of funds, (c) control of enrolment, management of students and assignment of graduates, (d) selection and production of teaching materials, (e) training of teachers, (f) management and appraisal of the teaching staff, (g) supervising and monitoring the work of all the relevant government departments, and so forth.

There is the notion of 'co-operative division of labour' where the Workers Union, the Communist Youth League, the Women's Federation, the Association for Science Popularization and so on, as mentioned above, all render assistance.

There were other forms of co-operation and co-ordination which were achieved through a network of national and local committees. Examples are the Anti-Illiteracy Working Committees set up in 1952, the Spare-Time Education Associations set up in 1956, and the Spare-Time Education Committees set up in 1960. Some of them are still functioning and playing an active role. There is the Workers' Education Committee at the national level, which is composed of the representatives from the State Economic Council and other government ministries involved in the administration of workers' education. There are also the local Worker-Peasant Education Committees or Workers' Education Committees, which are set up by provinces, municipalities and counties according to their own needs. The government education departments are usually represented in these committees and play an important role.

In addition, there are numerous non-governmental organizations, associations or societies for adult education, or research in adult education, at various administrative levels, which carry out studies on the theory and practice of adult education. Their contributions are again significant.

E. The development of adult education in China

Adult education saw the most dramatic expansion during the period 1958-1960. A total of 17,000,000 enrolled in workers' education in 1960, and an additional 115,000,000 attended adult peasant courses.

There was, however, an equally dramatic decline in enrolment after 1960. China suffered from severe economic setbacks during the so-called 'three years of difficulties' (1959-1961). Shortly after, there came the Cultural Revolution which is known in China as the 'ten years of turmoil' (1966-1976). Hence, in 1977, adult education had to be organized almost totally afresh. Since 1977, anti-illiteracy and worker-peasant education have witnessed gradual but considerable expansion. In 1983, the enrolment in educational institutions for adults of all kinds and at different levels amounted to 22,000,000. In addition, there were about 20,000,000 workers who took part in various organized learning activities conducted by their own units. Also, there was an even larger number of peasants who participated in various short-term technical training courses.

Table 1: Adult education statistics, 1985

Classification	Number of institutions	Enrolment ('000)
A. *Adult higher education*	1 216	1 725.0
1. Radio/TV universities	29	637.6
2. Workers' colleges	863	260.2
3. Peasants' colleges	4	0.9
4. Institutes for administration	102	40.3
5. Educational colleges	216	247.1
6. Independent correspondence colleges	2	9.9
7. Attached correspondence or evening colleges	-	493.0
B. *Adult secondary schools*	49 322	5 470.0
1. Technical secondary schools	4 189	1 347.0
2. Cultural secondary schools	45 133	4 123.0
C. *Adult primary schools*	100 337	3 148.0
D. *Literacy classes*	176 076	5 190.0

Up to 1983, about one hundred million workers and peasants had received elementary, junior middle, professional or technical education. Around 148,000,000 workers and peasants have been removed from the category of illiterates. The illiteracy rate among workers has decreased from 70 per cent before 1949 to about 5 per cent, and that among peasants from 80 per cent to about 20 per cent. From 1949 to 1982, the graduates from adult higher institutions of all kinds numbered 2,098,000, which is about half the graduates from regular higher institutes, who numbered 4,110,000. Table 1 shows the statistics of adult education in 1985. It presents the status quo as well as the rapid development in recent years.

The aim of this study is to analyze one specific type of adult education in China, the workers' college. We shall look at the development and the present situation of workers' colleges within the adult higher education framework. In Part 2, we shall study in more detail ten workers' colleges located in the provinces of Shanxi, Liaoning and Heilongjiang and in the municipality of Shanghai. In Part 3, we shall analyze the job situation of a sample of 800 graduates of these ten workers' colleges and compare with their counterparts in regular higher education institutions which offer similar courses of equal duration and equivalent qualifications.

However, since workers' colleges also form a substantial part of higher education in China, and in fact workers' colleges follow similar programmes offered in regular higher education institutions, we shall first delineate the picture of China's higher education in general in the following section.

II. 'Walking on both legs': the general policy of higher education development in China

In 1947, the peak year prior to the change-over of government in 1949, there were 207 institutions of higher education, with a total national enrolment of 155,000. Taking into account the national population at that time, enrolment in higher education represents three out of ten thousand people. In addition, most of the centres of higher learning were foreign-financed missionary or private institutions, small in size, and unbalanced in their geographical distribution. There were extremely few, if any, institutions of higher learning for adults.

The new government took over in 1949. When faced with the tremendous shortage of qualified manpower for reconstruction, it was soon clear that production of such qualified manpower could not rely solely on the classical type of higher education. Consequently, the general policy of 'walking on both legs' was adopted. In principle, 'walking on both legs' supports a dual system of regular higher education and adult higher education, giving full play and equal emphasis to both.

In this section we shall give a brief account of the systems of regular higher education and then adult higher education, as a background for the discussion of workers' colleges in the sections that follow.

A. Regular higher educational institutions

1. Student characteristics and aims of education

The full-time regular higher education institutions admit students who come directly from senior secondary schools, but may also take in young people under 25 with the attainment of senior secondary education.

The current admission system is based on a unified national examination, centrally administered, with unified syllabuses, unified papers and unified dates. There is also a centralized system to allocate the successful candidates to different institutions. It is an annual national exercise in which all the institutions participate in an overall plan. The exercise is further complicated by the choice preferred by the candidates and the specific needs of manpower in each economic sector.

The co-operative effort involved in the annual exercise is tremendous. It requires co-operation between the national planners and educational institutions, as well as that between the central and local governments.

There have been considerable reforms to move away from centralization. Shanghai, for example, has started its own entrance examination which was recognized nationwide, in 1986. Liaoning, as another example, started in 1985 a pre-selection at provincial level before the national examination. There have also been efforts to diffuse the exercise into the hands of local governments, which now administer their own allocation and admission exercises, and the central government only takes care of institutions of a national status.

The following may help to realize the nature of regular higher education institutions by broad classification:

- Graduates from universities[4] under direct control of the State Education Commission are basically assigned by the State to posts all over the country.

- Graduates from universities controlled by national non-educational ministries are assigned by the respective ministries to various enterprises or departments under them. The allocation is again nationwide.

- Graduates from universities controlled by different provincial authorities are allocated by the respective authorities to work within the respective provinces.

- In recent years, there emerged city-level universities which serve the manpower needs of the respective cities.

[4] Here, the term 'university', as it is used in Chinese, refers to all types of higher education institutions.

2. The curriculum

The specialities[5] in regular higher education institutions are designed and revised from time to time according to the practical needs in reality. There are however other factors, such as geographic distribution and the strength of individual institutions, that have to be taken into consideration. The following are more or less the general principles that guide curriculum design:

- Each institution has its well-defined orientation. Institutions of similar nature ensure that their curricula complement rather than duplicate each other. As far as possible each institution is expected to develop according to its own characteristics.

- Each speciality has its well-defined training objectives, but in the meantime has to avoid extreme narrowness in its scope of study.

- Attention is paid so as to avoid too many specialities in any one institution or to enrol too many students in any one speciality.

The development of curriculum and specialities is closely related to the development of economy, science and technology in the larger context. In the early 1950s, 103 engineering specialities were offered in higher education; the total number of specialities was 215. The 103 engineering specialities were grouped into 15 categories (called sub-fields of study). 1965 saw an array of 315 engineering specialities, when the total was 601. In recent years, a large number of newly developed specialities were added as a response to practical needs. By 1981, there were 684 engineering specialities regrouped into 18 sub-fields; the total number of specialities was 1,200. There was then a reclassification of specialities in the early 1980s. The situation in 1985 was 389 engineering specialities out of the total of 855.

[5] There are 11 'fields of study' in Chinese higher education: Engineering, Agriculture, Forestry, Medicine and Pharmacy, Teacher Training, Humanities, Natural Science, Finance and Economics, Political Science and Law, Physical Culture, and Arts. Each 'field of study' is further classified into 'sub-fields of study', e.g. Light Industry, Mechanical Engineering and Telecommunication are among the 14 'sub-fields of study' in Engineering. Within each 'sub-field of study' there are 'specialities' which are sub-divided into programmes. 'Specialities' are in fact packages of teaching programmes, with specific combination of subjects, specially designed for a particular job area in real work. Such 'specialities' are largely standardized all over the country and are widely endorsed by the employers.

3. General situation and major achievements

The development of regular higher education in China can be characterized by five historical phases:

- 1949-1957: Overall reform. Adaptation of the system to the changed political and economic environment.
- 1958-1966: Consolidation. Exploration and development of a model unique to the Chinese context.
- 1966-1976: The 'Cultural Revolution'. Higher education in China was practically disrupted.
- 1977-1983: Re-establishment. Resuming what went on before the Cultural Revolution.
- 1983 to date: New Reform. Reform in the administration and finance of higher education, accompanied by rapid expansion.

Chart 1 and Table 2 show the trends in student enrolments and number of graduates of higher education. It started with a rather small base (116,505 students for the whole country), but grew steadily during the period 1949-1957 at a rather high rate (18.1% per annum). There was then the 'great leap forward'.[6] in 1957-1960. Enrolment more than doubled (from 441,181 to 961,623) in three years' time. The tremendous expansion was followed however by a slight decline representing a consolidation of the situation. During the Cultural Revolution (1966-1976) enrolment decreased dramatically, reaching a low of 47,815 in 1970. Afterwards, however, it increased again and at the end of the Cultural Revolution it was more or less at the same level as at the beginning, although the demographic picture and the meaning of higher education had somehow changed. After the Cultural Revolution, in the period 1977-1983, enrolment increased regularly at an annual rate of 11.8 per cent. Since 1983, there has been dramatic expansion. The number of institutions has expanded at a rate of around 100 per annum and the enrolment has increased accordingly (see beginning of this report).

If we compare over the entire period between 1949 and 1985, the change in the distribution of institutions by fields of study is quite striking (Table 3).

[6] The 'great leap forward' was a national campaign aiming at dramatic development in the economy. It started in 1957, but was interrupted by the 'three years of difficulties' from 1959 to 1961.

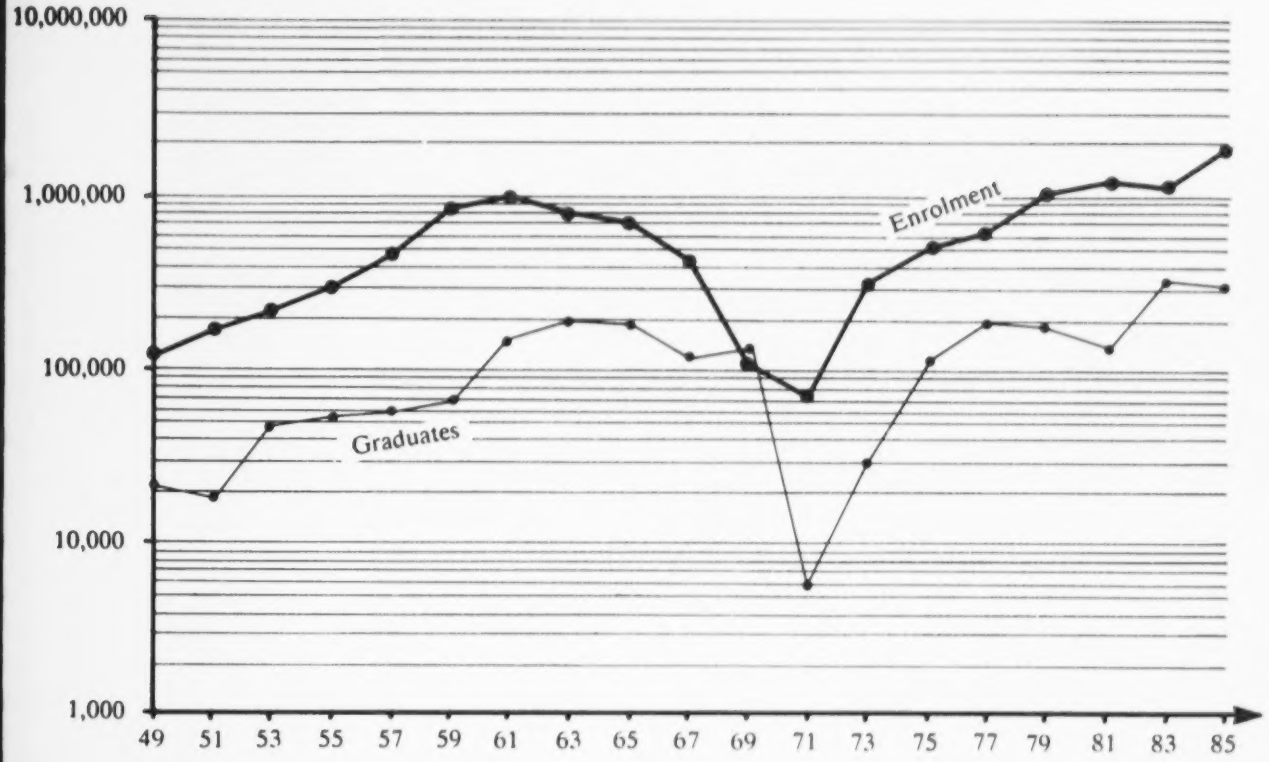

Chart 1: Higher Education (1949-1985)

Table 2: Development of higher education institutions in China (1949-1985)

	Institutions	Enrolment	Graduates
1949	205	116 505	21 353
1950	193	137 470	17 607
1951	206	153 402	18 712
1952	201	191 147	32 002
1953	181	212 181	48 091
1954	188	252 978	47 069
1955	194	287 653	54 466
1956	227	403 176	63 214
1957	229	441 181	56 180
1958	791	659 627	72 424
1959	841	811 947	69 839
1960	1 289	961 623	136 138
1961	845	947 166	151 283
1962	610	829 699	177 255
1963	407	750 118	198 754
1964	419	685 314	204 499
1965	434	674 436	185 521
1966	(a)	533 766	140 670
1967		408 930	124 836
1968		258 736	150 194
1969		108 617	150 119
1970		47 815	102 672
1971	328	83 400	5 945
1972	331	193 719	16 961
1973	345	313 645	30 057
1974	378	429 985	43 282
1975	387	500 993	118 955
1976	392	564 715	149 154
1977	404	625 319	194 426
1978	598	856 322	164 581
1979	633	1 019 950	85 085
1980	675	1 143 712	146 635
1981	704	1 279 472	139 640
1982	715	1 153 954	457 244
1983	805	1 206 823	335 344
1984	902	1 395 656	286 937
1985	1 016	1 703 115	316 384

(a) Exact figures for the number of institutions in 1966-1970 are not available because of the confusing situation during the Cultural Revolution.

Table 3: Comparison of regular higher education institutions by fields of study in 1949 and 1985

Subject	1949	1985	Increase 85/49
Comprehensive university	49	43	0.87
Science and engineering	28	262	9.35
Teacher training	12	253	21.08
Medicine	22	16	5.27
Agriculture	18	61	3.38
Finance and economics	11	62	5.63
Art	18	29	1.61
Physical education	2	16	8.00
Forestry	0	11	-
Language and literature	11	11	1.00
Politics and law	7	24	3.42
Others	27	128	4.74
Total	205	1 016	4.95

The number of teacher-training colleges has increased tremendously (more than 21 times) as the result of the priority given to the development of primary and secondary education.

4. Courses and students

There are largely three types of courses if we classify by their status:

- Diploma course (normally 2-3 years of study).
- Degree course (4 years of study or longer).

- Post-graduate studies (Masters and Doctorates).

The distribution of students according to these broad categories is given in Table 4, showing the growth from 1983 to 1985.

Table 4: Student enrolment by types of courses

	1983	(%)	1985	(%)
Diploma course	277 504	22.31	580 472	32.42
Degree course	929 319	74.70	1 122 643	62.70
Masters degree	36 429	2.93	83 692	4.67
Doctorate	737	0.06	3 639	0.20
Total	1 243 989	100.00	1 790 446	100.00

The distribution of enrolment (not including post-graduate students) and of graduates (Bachelors degree or diploma) by specialities in 1983 and 1985 is shown in Table 5. As can be expected, enrolment is highest in engineering, but the increases in teacher training, finance and economics, and humanities are remarkable. The distribution and its changes reflect accurately the needs and structural changes in the manpower. The 1985 distribution is presented diagramatically in Chart 2.

5. Institutions of regular higher education

By levels of administration, there are basically three types of universities: national, provincial and city-universities.

National universities are financed and administered by a central ministry. This can be either the State Education Commission or other non-educational ministries. As mentioned earlier, national universities exercise nationwide student recruitment and graduate allocation.

Provincial institutions are financed and administered by the education department or production departments at provincial levels. By a 'province' is meant a sub-national region, which is either a province such as Shanxi, one of the three municipalities (Beijing, Shanghai, and Tianjin), or one of the five Autonomous Regions where the minority ethnic groups predominate. The national State Education Commission still oversees the curric-

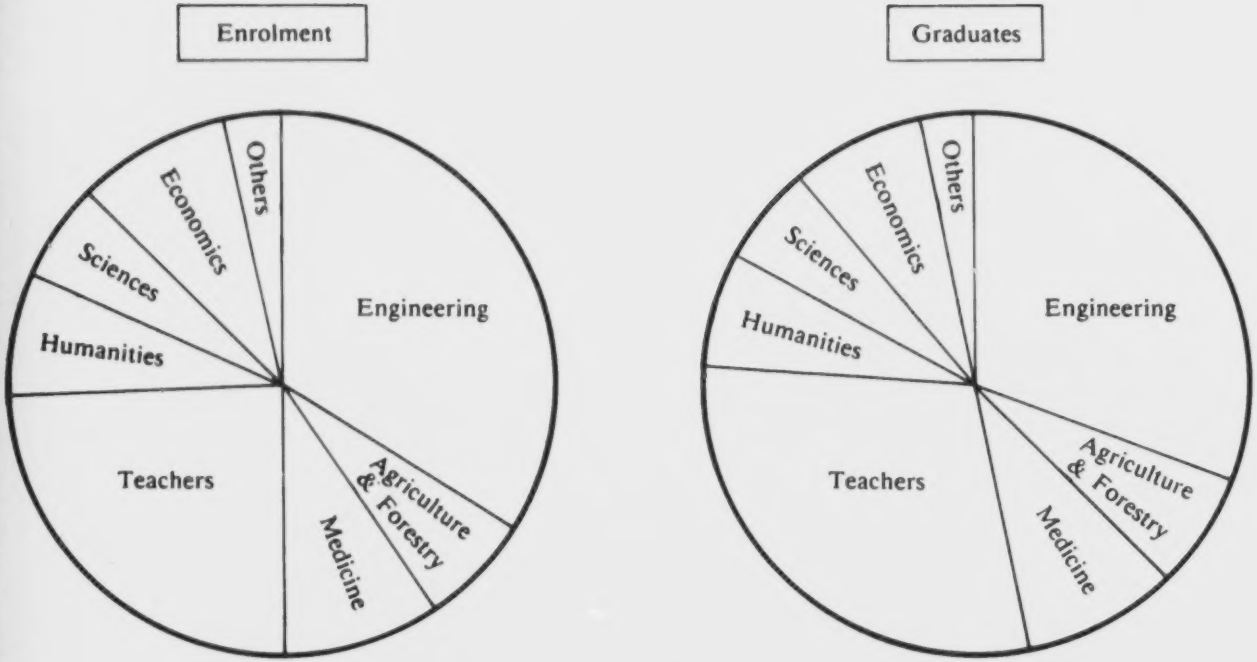

Chart 2: **Distribution of enrolment and graduates, 1985.**

Table 5: Distribution of enrolment and graduates (in percentage) by subject (1983 and 1985)

	Enrolment(a)		Graduates(b)	
	1983	1985	1983	1985
Engineering	34.7	34.1	33.2	30.9
Teacher training	20.0	25.0	26.9	29.7
Medicine	11.6	9.2	16.9	9.2
Science	6.6	5.7	6.3	5.9
Finance and economics	5.9	8.7	3.9	7.6
Humanities	5.6	7.4	5.3	7.1
Agriculture	5.6	5.2	5.0	5.5
Politics and law	1.5	2.1	0.9	1.7
Forestry	1.1	1.0	0.8	1.1
Physical education	0.8	0.8	0.8	0.8
Art	0.5	0.7	0.4	0.5
Total	100.0	100.0	100.0	100.0

(a) Not including post-graduate students

(b) Bachelors degree or diploma

ulum, professorial appointments, accreditation and so on of provincial universities from an angle of academic 'quality control'. As mentioned earlier, students of the provincial institutions are recruited within the province and graduates are assigned their first employment within the province.

There are newly emerging city-level universities which are partially financed by government resources and partially by enterprises. Such universities have greater autonomy in resource allocation and utilization. The city government or provincial government still oversees the academic affairs of the city-level institutions.

The financing modes are changing rapidly since 1983. Most universities enrol a considerable number of students who are financed according to different formulas by various client enterprises. It is not possible to describe in great detail such modes of finance in this report.

In terms of the course structures, most higher education institutions offer both degree and diploma courses. The better established universities offer mainly degree courses. There are 'specialized colleges', which offer mainly diploma or short-term two-year courses. However, there is no

clearcut distinction of higher education institutions by the status of courses they offer. Quite a few city-universities which are supposed to be specialized colleges, for example, also offer degree courses.

6. Prospects

Regular higher education in China has thus developed rapidly during the last three decades. With all sorts of ups and downs, re-adjustments and reforms, China has developed for itself a comprehensive framework of higher education. This is particularly significant in higher engineering education. It is clear that in the case of China, such a framework is closely geared to economic development and the needs for qualified manpower.

Nevertheless, it is exactly the demand from economic development that reveals the shortcomings of China's higher education system. The development of higher education in China seems to be hampered by three major discrepancies.

Firstly, there is an imbalance among fields of study. There are too many institutions for science and engineering and too few for humanities and social sciences. Some specialities, law, management and finance and economics in particular, are weak and the enrolments are remarkably low. Secondly, there is an imbalance between degree courses and diploma courses. Ratio of enrolments of the two was 3.5 : 1 in 1983, although it has been improved to 2 : 1 in 1985. Thirdly, there is an imbalance among colleges offering diploma courses. The majority of such colleges are for teacher training. However, it can be seen from the above tables that some of these discrepancies are being remedied.

China is a vast country with a huge number of clients who hold high expectations from higher education. It is obvious that in order to adapt itself to these diverse requirements, which are ever changing, there is a need for reform in both the structure and the management of higher education.

In 1983, a national policy was formulated to 'speed up' expansion of higher education. The main theme of the policy was to emphasize diversification and flexibility in higher education in terms of the modes of instruction, finance and administration. There was a call to develop higher education into a 'multi-level, multi-form and multi-scale' system. A medium-term plan (1983-1987) was subsequently drafted, the targets being:

- To increase the enrolment of regular higher education from 1,155,000 to 1,760,000, which means an average increase of 121,000 per year.

- To further develop adult higher education at all levels and in all forms. The preliminary target was to increase enrolment in adult higher education from 290,000 in 1982 to 1,100,000 in 1987.

To achieve the target, the following approaches and measures were encouraged:

- To increase the utility of existing facilities, the established institutions in particular, firstly by enrolling more students and secondly to operate affiliated colleges or evening colleges.

- To motivate the more developed cities and large enterprises to operate specialized colleges or short-term workers' colleges to cater for their own needs.

- To further develop radio/TV universities, correspondence universities, evening colleges and workers' colleges. Cities with a population of over one million are encouraged to set up their own educational TV stations.

- To actively develop technical and vocational education at secondary levels, to improve the 'base' of technical manpower.

Along these lines, intensive programmes for capital investment and teacher preparation have also been launched. Measures have also been taken so that more autonomy is given to local governments and institutions. All these were reconfirmed in the overall educational reform issued in 1985.

In sum, if all the plans bring fruit, there will be (a) a significant expansion in the enrolment, (b) an increased enrolment in the neglected areas, (c) a larger proportion of higher education devoted to specialized studies, (d) a larger proportion of diploma students as compared with degree students, and (e) more adult higher education.

The 1985 figures reveal that developments towards the target are remarkable. Total regular higher education enrolment, for example, already came near to the 1987 target in 1985.

B. Adult higher education

In principle, participation in adult higher education in China is not restricted by occupation, age, or place of residence. Anyone, if he or she has the desire, capacity and ability, may take part in adult higher education activities according to his or her own needs and interests. However, with the exception of independent study, admission to adult higher education is based on the results of a uniform national examination. This is viewed as one of the ways to guarantee the quality of adult higher education.

At present, adult higher educational institutions in China in general offer diploma courses and single courses, although there are an increasing number of cases where adult degree programmes were launched.

In the following sections, we shall introduce the major aspects of adult higher education in China.

1. Challenges ahead

Out of the 110 million workers in China, 50 per cent are young people under 35 years of age, 70 per cent of whom have had, at most, lower secondary schooling. Skilled workers in China are divided into eight standardized grades. The distribution, according to a recent survey,[7] is shown in Table 6.

Table 6: Distribution of skilled workers by grades and educational attainments

	Grades	Educational attainment	%
Low-skilled worker	1-3	Junior secondary or below	71
Medium-skilled worker	4-6	Senior secondary	26
High-skilled worker	7.8	Tertiary	3

It is an outstanding fact that high-skilled workers, i.e. professional technical personnel, constitute only 3 per cent.

The same survey revealed that high-skilled workers only constitute 4.3 per cent of the working force in mechanical industries and 1.06 per cent in the light industries. The ratio is even much lower in agriculture. In one of the better-off provinces, there are only 3.5 high-skilled workers among every 10,000 agricultural workers.

The demand for qualified manpower is not only a matter of national concern, but is felt as a matter of urgency in most of the enterprises in the entire country. Everywhere there is a demand for personnel who are capable of coping with modern technology, as well as the management of modern enterprises.

It is to redress this imbalance that development of adult higher education becomes of imperative importance. It is not only essential to speed up pre-service training, but it is an important strategy to upgrade the manpower which is already in service. According to estimates made by the various ministries concerned, regular institutions of higher learning and

[7] The survey was commissioned by the State Education Commission and carried out by the East China Normal University. An abridged version of the report can be found in Jiaoyu Yanjiu (Journal of Educational Research), 9, 1986.

secondary vocational education can produce only about 50 per cent of the fifteen million qualified personnel required by the development of the economy during the 1990s. According to projections made by the Ministry of Education, the demand for university graduates will reach five million by 1990. Three million of these have to come from adult higher education.

2. Categories of adult higher education in China

As far as the mode of operation is concerned, there are eight categories of adult higher education:

- Radio/TV universities
- Correspondence departments of regular institutions
- Evening colleges attached to regular institutions
- Workers' colleges
- Independent study examination for higher education
- In-service colleges for administrative staff
- In-service teacher-training colleges
- Peasants' colleges

There are also experiments in various provinces to use magazines and other means as the medium of instruction.

The workers' spare-time colleges (a synonym for workers' colleges), the correspondence colleges and the evening colleges have existed for quite a long time, while the radio/TV universities, teachers' continuing education colleges, management cadres colleges and the independent study examinations have emerged only in recent years. In addition, there are several peasants' colleges. The general situation is as follows (see also Chart 3):

a. Radio/TV universities

The radio/TV university system was created in February 1979. The Central Radio/TV University offers basic courses in general and specialized subjects. In 1983, 50 courses in 5 science and engineering specialities, and 40 courses in 7 economics specialities were available. After completion of the courses and acquisition of the required credits, the students receive a diploma from the local radio/TV universities which relay the courses offered by the Central Radio/TV University. They are officially recognized as university graduates.

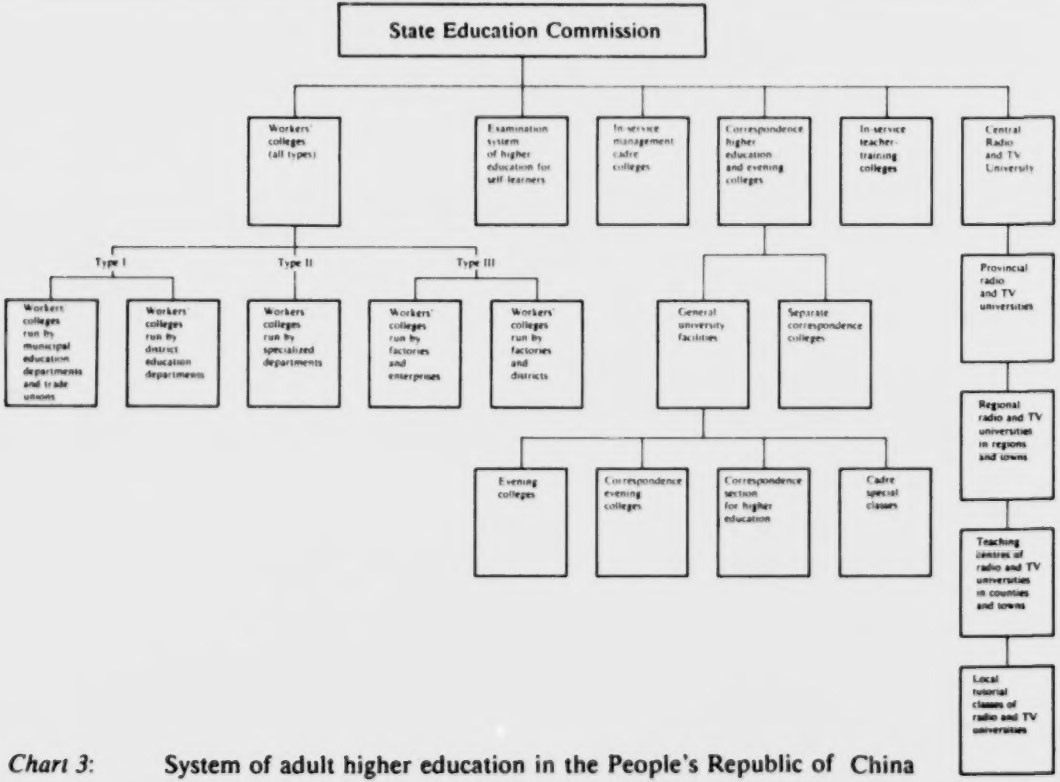
State Education Commission
Workers' colleges (all types)
Examination system of higher education for self learners
In-service management cadre colleges
Correspondence higher education and evening colleges
In-service teacher-training colleges
Central Radio and TV University
Type I
Type II
Type III
Workers' colleges run by municipal education departments and trade unions
Workers' colleges run by district education departments
Workers' colleges run by specialized departments
Workers' colleges run by factories and enterprises
Workers' colleges run by factories and districts
General university facilities
Separate correspondence colleges
Evening colleges
Correspondence evening colleges
Correspondence section for higher education
Cadre special classes
Provincial radio and TV universities
Regional radio and TV universities in regions and towns
Teaching centres of radio and TV universities in counties and towns
Local tutorial classes of radio and TV universities

Chart 3: **System of adult higher education in the People's Republic of China**

The Central Radio/TV University is jointly administered by the State Education Commission and the Ministry for Radio and Television. The Central Radio/TV University supervises the local radio/TV universities which are run and managed by provincial or municipal departments concerned. So far, with the exception of Tibet in the Mainland, all the provinces have set up their own radio/TV universities. A network of education by radio/TV has virtually covered the entire country with its radio/TV universities, local affiliated schools ('branch' schools), teaching centres and tutorial classes. On July 1, 1986, the network started to make use of artificial satellites as a means of transmission.

Since the establishment of the radio/TV universities, the enrolment of the three-year programmes has reached 800,000. As of the academic year 1982-1983, the diploma course classes had turned out more than 150,000 graduates, and the single-course classes more than 200,000. There were 478,800 students in all in 1983, of which 414,100 were diploma course students. The last figure rose to 673,634 in 1985.

b. Correspondence and evening studies

Most of the established universities run correspondence studies (often through their departments of correspondence studies) and evening studies (often in the form of an attached evening college).

These are of two categories: degree courses and diploma courses. The former offers five to six years' specialities in science, engineering, forestry and agriculture; the latter offers four years' specialities in science, engineering, agriculture and forestry; four years' specialities in medical science (excluding medical treatment); and three to four years' specialities in the humanities and social science. In addition, single courses are available to administrators in all areas for upgrading purposes.

Correspondence departments take students primarily from among employed people, and try to cater for the needs of their respective jobs. Students who have completed the courses and passed required examinations receive certificates and are treated as equivalents to graduates of regular universities.

In 1983, 378 regular universities had set up correspondence departments or evening colleges. Of these, 155 have only correspondence departments, 169 have only evening colleges, and 54 have both. In addition, there are three independent correspondence colleges managed by local departments of education, with more than 8,000 students. In 1985, the number of offering institutions increased to 591.

c. Workers' colleges

Workers' colleges may include workers' spare-time colleges. The term in Chinese literally means universities for staff members and workers.[8] The main part of the student body comes from 'factories, mines and enterprises'[9] The specialities and courses are the same as those offered by regular three-year specialized colleges.

Administratively, workers' colleges can be divided into three types: (i) regional workers' colleges run by local educational departments or workers' unions, (ii) workers' colleges run by non-educational ministries, national

[8] In the Chinese literature, 'staff members and workers' often come together to mean all members in an industrial enterprise. In fact, 'staff members' are those who are not directly involved in production—administrators, clerical staff members, caretakers, and so on. We shall use 'workers' to include also such staff members.

[9] 'Factories, mines and enterprises' is the phrase used frequently in the Chinese literature to indicate all kinds of work units in the industrial sector. We shall use 'enterprises' in the rest of the text to denote these units.

commissions and local industrial departments, and (iii) workers' colleges run by enterprises.

By regulation, workers' colleges enrol workers who are under 30 and have at least two years' working experience. In addition, they must have completed senior high school education, have passed the national entrance examination (for adult higher education), and be of acceptable moral conduct and physical fitness. The length of study for full-time students varies from four to five years.

As workers' colleges are the main subject of this study, we shall leave the detailed analysis to later parts of the report.

d. Examinations for independent study

In this system, the adult students mainly undertake self-study according to schedules laid down by a provincial committee and follow guidelines, text-books and reference books recommended by the examining institution. They then sit for a national examination administered by local committees. The examining institution is usually an established institution of higher education. The student may also receive assistance from various voluntary or fee-charging agencies in the community, but the large part of the course is done by independent self-study. The assistance may take the form of face-to-face teaching, correspondence, radio or TV broadcasting, and audio or video records. Hence the system has become a combination of individual study, community assistance and national examinations.

The system was experimented in three major cities and one province in 1981 and has become a national exercise since 1983. Most of the provinces, municipalities and autonomous regions have set up their local committees for self-study examinations. Specialities are now being offered in areas such as liberal arts, science, engineering, agriculture, finance and economics, and politics and law.

According to the present regulations, those candidates who have passed the required examinations for four-year degree courses, three-year diploma courses or single courses will be issued a Bachelor degree, a diploma, special-course certificates and single-course certificates respectively. Those who have previously worked will have their jobs adjusted by the factories or the relevant government departments according to their new qualifications. Those who have never worked before will be recruited as equivalents to graduates from regular higher institutions.

During the first half of 1983, more than 73,000 applicants sat for the examinations in Beijing, Tianjin, Shanghai and Liaoning, and during the second half of the same year, the number of examinees increased to 188,000. More than 115,800 single-course certificates have been issued. In 1985, there were 34 specialities facing more than a million candidates. In July 1986, Bachelor degrees were for the first time conferred to successful candidates in Beijing. Over the past six years, 13 such examinations have

been conducted in Beijing, producing more than 4,100 degree and diploma graduates. In addition, 170,000 single-course certificates were issued.

One special feature of the self-study examination mode of adult education is its openness in admission. The official regulation stipulates that "any citizen of the People's Republic of China may apply". There is no restriction whatsoever as regards occupation, age, or educational background, nor is there any restriction in the number and combination of subjects. Although the general impression that independent study is the most painstaking amongst all modes of adult education, this is so far the only case of higher education in China where admission is unconditional. There have been discussions of extending this principle to other modes of adult higher education.

The flexibility and openness of the independent study examination soon made it a very popular form of adult higher education. The openness and flexibility has also made the examination the only way of 'quality control'. The State Education Commission therefore has tight control on the examination. Despite the strictness of the examination, the pass rate is still high, around 50 per cent in some of the provinces.

e. In-service administrators' colleges and in-service teacher-training colleges

These two kinds of adult education institutions have been set up for in-service administrators and teachers. The administrators' colleges are mainly designed to upgrade the management capabilities of practising administrators. Teacher-training colleges serve to upgrade the professional knowledge and skills of practising teachers, as well as to train the under-qualified teachers.

The aforementioned adult education institutions have formed a national network with various types of institutions and different modes of learning. In China, this is usually referred to as the 'multi-level, multi-form' adult higher education system.

3. The developments and general situation

The development of adult higher education in China has involved two main phases:

Before 1965, the training of in-service administrators and workers was the major objective of adult education. The participants attended spare-time workers' colleges and studied mainly after working-hours. Some of them also attended correspondence or evening colleges attached to regular higher institutions. In 1965, there were 263,000 out of 413,000 adult students studying in workers' spare-time colleges and 150,000 studying in correspondence or evening colleges (Table 7).

During the 1951-1965 period, most of the participants in adult higher education programmes were enrolled in spare-time workers' colleges and the rest in correspondence and evening colleges.

Table 7: Enrolment and graduates of adult higher education institutions in 1951-1965

Year	Enrolment	Number of graduates
1951	1 600	
1952	4 100	
1953	10 000	1 700
1954	13 000	2 400
1955	16 000	3 000
1956	64 000	1 300
1957	76 000	3 100
1958	150 000	5 000
1959	300 000	4 000
1960	793 000	8 000
1961	410 000	18 000
1962	404 000	36 000
1963	418,000	33 000
1964	435 000	43 000
1965	413 000	42 000

In 1966, all adult higher education institutions were closed down. A number of institutions were established in 1968 as 'July 21 universities' for workers, and a few others as 'May 7 universities' for peasants. 'July 21 universities' and 'May 7 universities' are institutions established following Chairman Mao's instructions on the respective days. 'July 21 universities' will be discussed in greater detail in the following section. It was only in 1972 that reliable statistics became available and there were only 68 'July 21 universities' in the entire country, having a mere student population of 4,000. If we add to these a few peasants' 'May 7 universities' and other 'political evening colleges', there were still only 195 institutions all over the country with 16,582 students.[10] Adult education in this period was insignificant.

The second phase started after 1976. The nature of students of adult higher education has changed. In addition to cadres and workers, teachers, peasants and other school-leavers also take part in various modes of adult higher education: spare-time, 'half-working, half-studying' and full-time.

The total number of graduates was 3,138,600 from 1953 to 1982; 2,098,000 obtained a Bachelor degree or a diploma and the rest completed one or two single courses.

[10] See Zhongguo Jiaoyu Nianjian 1949-1981 (China Education Yearbook), Chinese Encyclopaedia Press, 1982, p. 594.

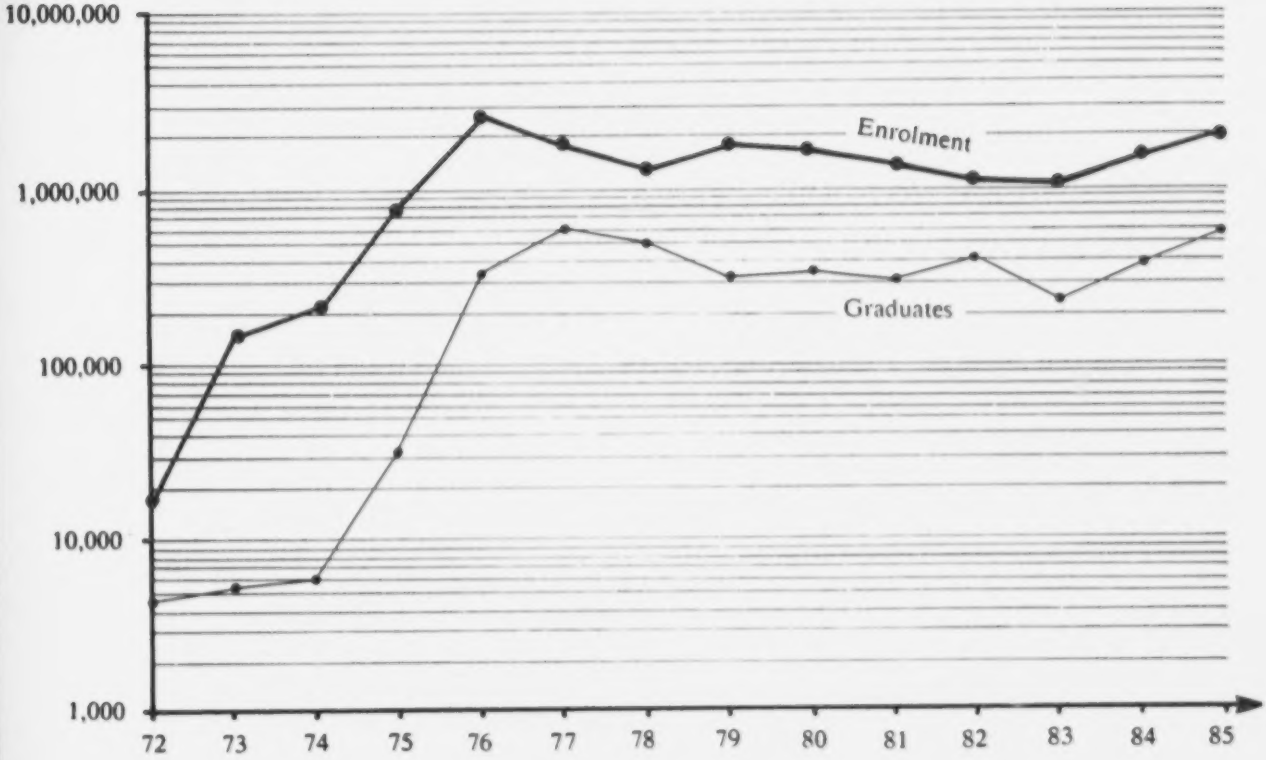

Chart 4: Adult higher education 1972-1985

Table 8: Enrolment and graduates of adult higher education institutions (1972-1982)

Year	Enrolment	Number of graduates
1972	16 582	4 200
1973	146 000	5 600
1974	213 726	6 100
1975	729 016	37 700
1976	2 628 568	356 900
1977	1 738 922	620 300
1978	1 408 295	510 200
1979	1 722 196	320 600
1980	1 544 061	335 800
1981	1 346 260	315 300
1982	1 172 656	425 400
1983	1 128 375	235 000
1984	1 478 000	376 500
1985	1 986 000	591 200

The great increase in enrolment during the period from 1973-1976 (Table 8 and Chart 4) resulted from the rapid development of 'July 21 workers' universities'. The number of 'July 21 universities' increased from 68 in 1972 to 33,374 in 1976, holding an enrolment of 1,485,000. At the same time most of the correspondence and evening colleges were closed down. It has to be noted that the figures after 1979 do not include those students who sit for independent-study examinations.

III. The workers' colleges

A. The Development of workers' colleges

Workers' colleges in China form an important component both of the national higher education system and of adult higher education. Workers' colleges include workers' spare-time colleges which do not offer full-time programmes. The major objectives of workers' colleges are:

(a) to train the workers so that they can take up professional and managerial posts in industry;

(b) to train, in rotation, in-service cadres and skilled personnel so as to enable them to up-date their knowledge and to upgrade their professional capabilities;

(c) to develop capacities of scientific research, consultancy and technical assistance to industry;

(d) in some cases, to provide assistance in the operation of radio/TV universities and correspondence universities.

The development of workers' colleges in China can be described in three historical periods:

1. Before the Cultural Revolution (1949-1966).

In the early days of New China, 70 per cent of the 8,000,000 workers were illiterate. At that time, the priority in workers' education was given to literacy campaigns, i.e. to elementary and secondary education levels. In 1953, some regular institutions of higher learning created a few correspondence departments and evening colleges of higher education with a small enrolment. In 1956, with the national theme of rapid construction,

workers' colleges of all types began to emerge. In 1958, the guiding principle of 'walking on both legs' was manifested for the development of education, and a number of workers' spare-time colleges were set up for the training of experienced workers. By the end of 1958, there were 265 workers' spare-time colleges run by factories and enterprises. The total enrolment was about 150,000. After 1961, after major economic setbacks, there was a national movement of 're-adjustments, strengthening and replenishment'. Workers' education was further developed and more emphasis was placed on quality. By the eve of the Cultural Revolution in 1966, there were 758 workers' spare-time colleges (including correspondence and evening colleges) with a total enrolment of 400,000 and a teaching staff of 8,000 full-time members. During these seventeen years before the Cultural Revolution, more than 200,000 students graduated from various kinds of workers' spare-time institutions of higher education.

2. During the Cultural Revolution (1966-1976)

During the so-called 'ten years' turmoil' workers' higher education stagnated. On July 21, 1968, Chairman Mao commended the example of Shanghai Machine Tool Plant and instructed the whole nation to 'train technical personnel from workers'. A first full-time 'July 21 university' was set up in the plant. Following this example, a large number of 'July 21 universities' were established all over the country. By 1975, there were 15,000 'July 21 universities' with a total enrolment of 720,000 students. In 1976, just before the end of the Cultural Revolution, there were 33,374 'July 21 universities' with a student population of 1.5 million.

3. After the Cultural Revolution (1976 to date)

The Cultural Revolution was brought to an end in 1976. In 1978, the nation started its strife for modernization. Alongside the gradual stabalization of the nation's political and economic situation, many workers' colleges were reopened or created. There was also a reorganization of the 'July 21 universities'. By the end of 1978, there were 3,477 'July 21 universities' left with a student population of 103,000. Some were closed, others were converted into workers' colleges.

The basic criteria for the operation of workers' or peasants' higher educational institutions are, as laid down by the central government in 1979, as follows:

- The students who are admitted should have attained senior secondary education.

- the curriculum basically follows that of regular three-year specialized colleges.

there should be a basic full-time teaching staff and a full-time administrative staff.

All workers' colleges have to be approved by and registered with the relevant educational authorities. Beginning from 1980, there was an evaluation of the 'July 21 universities'. Qualified 'July 21 universities' were reorganized and renamed workers' colleges or workers' spare-time colleges.

There was then a call in 1981 for a spreading of workers' education to all educational levels and a diversification of formats in workers' education. Training of leading administrators and remedial education for young workers were identified as a current priority of workers' education.

In July 1983, when this survey was carried out, there were 784 workers' colleges with a student population of 129,262. By the end of 1985, the number of workers' colleges reached 863 with an enrolment of 260,211.

B. The current situation of workers' colleges

In terms of geographical distribution, 28 provinces (with the exception of Tibet on the Mainland), municipalities and autonomous regions have established workers' colleges of some kind. In July 1983, the provinces and municipalities with the highest number of workers colleges' were Shanghai (61), Jiangsu (56), Tianjin (54), Heilongjiang (46), Liaoning (43), and Beijing (29). Those with less than 10 workers' colleges were Inner Mongolia, Yunnan, Fujian, Qing Hai, Anhui, Ningxia and Guizhou.

As far as the sponsoring body is concerned, the 784 workers' colleges can be divided into three types (Table 9).

As regards the size of the workers' college, it was by regulation that those workers' colleges with less than 90 students (two classes) could not register with the Ministry of Education. However, the actual enrolment of many workers' colleges does not reach this number because of the shortage of qualified teachers or because of the short history. The distribution is shown in Table 10.

In terms of the curriculum, a total of 286 specialities in sciences, engineering, medicine, liberal arts and physical education were offered. Of these, 115 (40 per cent of the total) were related to machinery, electronics, automation and other engineering specialities. The enrolment in these 115 specialities was 58,534, accounting for 45 per cent of the total enrolment.

In the past few years, the workers' colleges have been reopened and reorganized. Administrative rules and regulations were tightened. A number of new issues thus emerge:

Table 9: Comparison between the three types of workers' colleges

	Number of schools	Percentage	Enrolment	Percentage	Average enrolment per school
Organized by specialized ministries or industrial departments	414	52.8	53 708	41.55	129
Organized at regional level by departments of education or labour unions	82	10.46	47 890	37.05	584
Organized by factories, mines and other enterprises	288	36.74	27 664	21.40	96
Total	784	100.00	129 262	100.00	165

Table 10: Sizes of workers' colleges as at 1983

Size	Number	%
Less than 90	407	51.9
90 - 200	53	6.8
200 - 300	243	31.0
300 - 500	38	4.8
500 - 1000	27	3.4
Over 1 000	16	2.0

1. The goals re-examined

In 1981, workers' colleges were redefined by the then Ministry of Education as institutions of higher education for workers, with the specific aim of training skilled personnel. Programmes in workers' colleges would follow the three-year programmes taught in regular colleges. A few workers' colleges, however, might also offer degree courses. In 1983, the Ministry of Education redefined the qualifications that should be acquired by graduates of workers' colleges:

> "Mastery of the fundamental theories, the main body of knowledge and the major technical skills necessary in the respective fields, with the ability to analyze and solve technical problems in the reality of respective specialities, and the ability to use one foreign language in reading books and journals in their own specialities."

This means that all workers' colleges, whatever form they take, whatever their size and under whatever conditions they are operating, have the same educational objectives as specialized colleges. The two belong to the same stratum of the higher educational system in China.

2. Structure and curriculum

The undergraduate students in the regular institutions of higher learning are required to study for four or five years and the students of specialized colleges are required to study for two or three years. The situation in workers' colleges is more complicated. There are different modes of learning: full-time, part-time and spare-time; hence there is no uniform pattern of course-duration.

Apart from that, workers' colleges and regular institutions of higher education share the same objectives and the same curriculum. In 1983, a few workers' colleges with the best conditions, for example the Shanghai Workers' Spare-Time College, offered degree courses. After four years of full-time study, the graduates of these colleges would acquire qualifications equivalent to degree graduates of regular universities following the same specialities.

The diploma courses offered by the workers' colleges are similar to those of the regular three-year specialized colleges. The common objective of both types of institution is to train technicians and engineers with the ability to put their knowledge into practice. The full-time students are required to study for three years and part-time or spare-time students for four years. It is required that the qualifications of graduates from this kind of workers' college be equivalent to that from the same speciality in a three-year course in a regular specialized college. Most of the existing workers' colleges belong to this kind.

According to the guidelines laid down by the Ministry of Education, the total number of teaching hours of theory for full-time students in science and engineering should be 2,000-2,200 periods and that of liberal arts no less than 1,600. As for part-time and spare-time students in science and engineering, the required number of hours of theory should be 1,800-2,000 periods and in liberal arts no less than 1,600 periods. The instruction in workers' colleges is conducted according to the teaching programme and syllabus of the standard three-year diploma courses. This is to enable the graduates of workers' colleges to come up to the same level and enjoy the same status as the graduates from regular specialized colleges.

In general, the programme is prepared and handed down by the Ministry of Education or the relevant education departments in other ministries or in the provincial government. The workers' colleges are supposed to follow, but may however make some changes to fit the specific practical needs of the enterprises and the characteristics of different specialities. The relevant educational authority fixes the norms about the required teaching hours and each college can decide the actual number of periods depending on the circumstances. According to the guidelines given by the Ministry of Education, the distribution of class hours for the various courses can be described as follows: 600-800 periods for basic theory courses, 600-800 periods for basic technical courses and 400-600 periods for specialized courses. The workers' colleges can use the guidelines for reference in deciding the exact proportion of class hours for each subject.

3. Examinations and assessments

Given the variety in modes and duration of study, assessments in workers' colleges have become a crucial element for 'quality control'. A number of measures have been adopted to guarantee the quality of graduates, to help improve the learning climate and teaching quality.

In 1982, the then Ministry of Education introduced standardized assessment procedures in workers' colleges. In practice, all applicants to workers' colleges take a unified entrance examination organized by the respective local education departments. Most of the provinces selected four or five basic courses for the unified examination. On completion of the required courses, the students have to hand in their graduation projects (or theses) and take part in the graduation examination held by respective colleges. The objective of the procedures was to guarantee the quality of the student intake on the one hand and the graduates on the other.

Unified examination was hence organized by most of the provinces. According to a survey carried out by the Ministry of Education in 1982, for 494 workers' colleges controlled by 21 provinces, municipalities, autonomous regions and two non-educational ministries, about 86,000 students took the uniform entrance examination and 25,000 were admitted to workers' colleges, i.e., an average ratio of 1 in 3.4.

Standard procedures and systems of student management were also issued by the Ministry of Education in 1983. These include students' registration, students' records, students' status, examination and grading system, graduation, transfers, repetitions, drop-outs, suspensions, conduct, class attendance, awards and disciplinary actions.

Such tightening measures serve not only to improve the operation of workers' colleges, but also to upgrade the status and prestige of their graduates. Only then, graduates of workers' colleges would enjoy the same employment opportunities and entitlements as their counterparts from regular universities.

4. Job assignment of graduates

To further strengthen the status of workers' colleges, the central government, in 1983, issued an instruction in connection with the certification, job opportunities and other entitlements of graduates from workers' colleges and other similar institutions of adult higher education.

It is stipulated that if a student has graduated from a registered workers' college (or other adult institutions), his or her certificate is officially recognized. This guarantees assignment to a proper job position with proper salary entitlement. Further, even graduates from *unregistered* workers' colleges may enjoy the same legal status if they have passed the unified examination organized by the local authorities. They would also acquire the equivalent certification and recognition.

Assignment of graduates from workers' colleges is usually carried out under the broad principle of 'where from, where to'. Admission, training and job assignment form integral parts of a coherent plan: planned enrolment, planned training according to needs, and planned job allocation. Before admitting students, the workers' colleges first submit their enrolment proposals, by distribution of specialities, to the enterprises. The enterprises then recommend qualified workers for the entrance examination. If they pass the examination and are admitted to the workers' colleges, the workers continue to receive their original salaries from the enterprises. Expenses related to their study are included in the budget of their own enterprises under the item 'staff training'. After graduation, the students generally return to the enterprises they came from. Their qualification acquired from the workers' colleges will normally be respected and hence their posts and salaries adjusted, as if they were graduates from regular universities.

Part 2
Analysis of ten workers' colleges

I. General overview of the workers' colleges in Shanxi, Liaoning, Heilongjiang and Shanghai

This research project is based on a survey conducted in ten workers' colleges located in the provinces of Shanxi, Liaoning, Heilongjiang and in the municipality of Shanghai. Before analyzing these ten workers' colleges, it may be helpful to present the situation of workers' colleges in general in these provinces and municipality (Table 11), so that the survey could be put into the context of situations and developments in their own regions. It has to be borne in mind, however, that the situations refer to 1983. Much has been changed since.

Table 11: Basic information about workers' colleges in the provinces of Shanxi, Liaoning, Heilongjiang and the municipality of Shanghai (1983)

	Total no. workers ('000)	No. of work. coll.	Total no.of spec.	Enrol.	College staff	
					Total	Full-time
Shanxi	3 180	33	92	3 983	1 091	520
Liaoning	8,000	68	60	17 620	-	2 600
Heilongjiang	5 000	75	216	16 000	3 615	2 104
Shanghai	4 750	66	200	20 635	3 294	1 789

Note: The term 'worker' in the table includes all people, not necessarily labourers, who work in industrial and commercial enterprises. 'Spec.' is an abbreviation for 'specialities' offered in the curriculum of the workers' colleges. 'College staff' denotes the entire teaching, non-teaching and supporting staff of the workers' colleges.

A. Workers' colleges in Shanxi

Shanxi Province is one of the important bases of coal production in China, with a total of 3,180,000 workers.[11] Early in the 1950s, in order to meet the manpower needs of industrial development in Shanxi Province, some industrial enterprises with better conditions created a few workers' colleges, for example the Spare-Time Engineering College of Taiyuan Mining Machinery Plant and the Spare-Time Chemical Engineering College of Taiyuan Chemical Plant. Other workers' educational institutions of various types, at all levels, also developed rapidly. During the Cultural Revolution, all institutions of higher learning were closed down and later replaced by a few 'July 21 universities'.

Starting from 1978, a number of 'July 21 universities' were gradually reorganized and re-established as workers' colleges. In 1983, there were 33 workers' colleges approved by the various government departments, with a total enrolment of 3,983 students. Among these colleges, two were regional, thirteen were run by production ministries, bureaux or companies,[12] and eighteen were run by factories and enterprises. These workers' colleges produced a total of 2,988 graduates during the period 1978-83.

The various workers' colleges in Shanxi offered 92 engineering courses (for example, mechanical engineering for light industry, mechanization of mining, mining machinery manufacturing and repairing, chemical machinery, hoist and transport equipment, etc.). Most of the courses were practical in nature and were adapted to the priority needs of production, but there were also more general courses offered by some regional colleges to meet the overall demand of the province. The teaching programme of each speciality was equivalent to that of regular institutions of higher education.

The expansion development of workers' colleges was accompanied by improvement of the teaching force, both in terms of quality and quantity. In 1981, there were 1,091 full-time members in the teaching and administrative staff, including 520 full-time teachers. There were 200 teachers, i.e. 40 per cent of the teaching staff, with professional titles ranking from lecturer[13] to higher. The teacher/student ratio was 1 : 6.6.

[11] Workers include all those who work in industrial or commercial enterprises. They do not include for example the peasants of rural areas.

[12] Companies in this context are large networks of factories in the same trade, as sub-units of bureaux.

[13] There are mainly four ranks among teachers in higher education institutions in China: professor, associate professor, lecturer, and sometimes assistant lecturer. Others are simply teachers.

The mode of financing of workers' colleges varies according to their types. In the factory-run workers' colleges, expenditures fall within the factory budget either under the heading 'business management expenses' or 'workers' education expenses'. The regular colleges and the colleges run by specialized ministries might charge the relevant factories and enterprises for tuition. For example, the Survey and Cartography Workers' College of North China, located in Taiyuan, enrolled students from several provinces and charged 700 yuan for the annual tuition per student. Taiyuan Spare-Time Workers' College charged a much lower annual tuition fee of 120 yuan per student. In all cases, tuition was paid almost entirely by the factories and enterprises from which the students came. Only a small proportion was borne by the students themselves.

Since 1978, the workers' colleges in Shanxi have undergone continuous reforms. Prompted by assessment and approval measures carried out by the provincial authorities, many workers' colleges moved toward better facilities and better teachers. However, taking the overall situation into consideration, much room was still left for improvements in administration, teaching force, laboratory equipment and teaching methods. It was still a long time before there could be a comprehensive system.

B. Workers' colleges in Liaoning

Liaoning is characterized by its 8,000,000 workers in various industries and services—the highest number of all provinces of China. Liaoning is also one of the provinces in which the earliest workers' colleges were created. As early as 1954, Anshan Iron and Steel Company established a workers' evening college and Shenyang Liming Machinery Factory set up its workers' spare-time college. During the Cultural Revolution, a number of 'July 21 universities' were established.

In 1979, a reorganization of the workers' colleges took place. The objective of the reorganization was to reduce the disparity between the colleges run by the light and heavy industry sectors. The reorganization included a redistribution and restructuring of the specialities offered by the colleges in both sectors. While the colleges in the heavy industry sector were re-established, much emphasis was placed on those in the light industry sector. As a way to make efficient use of limited resources, specialities in some key areas were jointly sponsored by many smaller or poorer-equipped factories and enterprises. As a result, it was frequent that a workers' college was sponsored by several factories and offered quite a range of programmes.

By the end of 1983, 71 workers' colleges were approved by the relevant authorities; 68 of these were officially registered with the then Ministry of Education. The total enrolment was 17,620. More than 60 specialities were offered (40 per cent of them in the engineering category,

20 per cent in electronics, 10 per cent in civil engineering and building, 10 per cent in economics, 10 per cent in liberal arts and 10 per cent in other specialities). There were 2,600 full-time teachers, including 37 associate professors and senior engineers (1.4 per cent) and 817 lecturers and engineers (31.42 per cent). One thousand students graduated from these colleges during the period 1978-1983.

The same carefully planned reorganization since 1978 effected a more balanced distribution of workers' colleges in the province. Each large city, directly under the control of the province, had its own workers' colleges. There were 27 workers' colleges in Shenyang, 15 in Dalian, and 2 to 4 in each of the other cities.

C. Workers' colleges in Heilongjiang

Heilongjiang Province is one of the important bases of machinery, oil-mining, coal-mining and timber industries. There were 5,000,000 workers in the industrial and service sectors of the province. As early as the 1950s, the famous '403' Workers' Spare-Time College and Harbin Workers' Spare-Time College were established. In 1973, there emerged a number of 'July 21 universities' which were small in scale.

There were in recent years re-adjustment and reforms of workers' colleges. In 1983, there were in Heilongjiang 75 workers' colleges and workers' spare-time colleges, with 41 of them run by provincial educational departments or regional trade unions, and 34 by large enterprises. It is noticeable that the latter amounted to 45 per cent of the total. The total enrolment was 16,000. A total of 216 courses (in electronics, machinery, architecture, textiles, food processing, statistics and planning, etc.) were offered. There were 3,615 full-time members on the teaching and administrative staff, including 2,104 full-time teachers. Among the full-time teachers there were 28 (1.3 per cent) associate professors and senior engineers, 685 lecturers and engineers (32.6 per cent), and 1,291 (66.1 per cent) other teachers.

Table 12 shows the results of a tracer study on 954 graduates of 1981 and 1,155 graduates of 1982 in various workers' colleges of Harbin, Heilongjiang.

About 65 per cent of the graduates were technicians or above (including nearly 3 per cent holding leading posts at factory or workshop levels). The rest returned to their posts as skilled workers. More than 70 per cent of the graduates have been awarded professional titles of different ranks. In total, more than 60 per cent were promoted to higher positions (or professional titles) after their studies in the colleges.

Table 12: Positions occupied and professional titles of graduates of workers' colleges in Harbin

	1981		1982	
	Number	%	Number	%
Position occupied				
Factory-level managers	1	0.1	1	0.1
Workshop-level managers	32	3.3	25	2.2
Technical workers	638	66.9	672	58.1
Skilled workers	283	29.7	457	39.6
Total	954	100.0	1 155	100.0
Professional titles				
Engineers	37	3.9	29	2.5
Assistant engineers	65	6.8	49	4.2
Technicians	366	38.4	179	15.5
Trainee technicians	197	20.6	583	50.5
Teachers	18	1.9	24	2.1
Sub-total	683	71.6	864	74.8
No professional titles	271	28.4	291	25.2
Total	954	100.0	1 155	100.0

D. Workers' colleges in Shanghai

Shanghai, the largest city and one of the economic and cultural centres of China, has a workers' population of 4,750,000 and a long history of workers' education. The present distribution of workers by levels of educational attainment is as follows:

- Primary education : 45 per cent
- Junior secondary education : 43 per cent
- Senior secondary and technical education : 10 per cent
- Higher education : 1.4 per cent

Since 1978, the 'July 21 universities' in Shanghai (where in fact they originated) have been reformed and reorganized twice. The distribution of specialities was re-adjusted and the curricula standardized. In 1983, there were 68 approved workers' colleges in Shanghai, offering about 200 specialities. Eleven workers' colleges were run by the municipal or district governments, two jointly by government agencies and community groups, two jointly by several large factories, and three exclusively each by a factory. The total enrolment was 20,635. From 1980 to 1982, there was a total of 7,200 graduates.

Table 13: The distribution of teachers by category in colleges run by different authorities

Categories of teachers	Municipality	Prefecture	Factory	Total
		Absolute figures		
Professor & Assoc. prof.	15	-	8	23
Lecturers	306	309	658	1 273
Assistants	53	-	440	493
Others	80	522	903	1 505
Total	454	831	2 009	3 294
		Percentages		
Professor & Assoc. prof.	3.3	-	0.4	0.7
Lecturers	67.4	37.2	32.8	38.6
Assistants	11.7	-	21.9	15.0
Others	17.6	62.8	44.9	45.7
Total	100.0	100.0	100.0	100.0

Note: There are 55 factory-run colleges, 10 prefecture-run colleges and 1 municipality-run college.

The characteristics of the Shanghai industries determined that about 140 specialities were directly related to engineering (60 per cent of them on machinery, and 40 per cent on electronics, chemical engineering, metallurgy, etc.). There were also a few specialities in social science, finance and economics, etc. The specialities in the colleges run by enterprises or factories were often tailor-made to fit the special needs of production (for example, the technology of rubber processing, brewing, printing, clock- and

watch-making, etc.). These specialities were not offered in most regular colleges.

The colleges vary widely in terms of buildings, equipment and quality of teachers. The conditions of the Shanghai Municipal Spare-Time Industry College, run by the municipal government, were relatively favourable as compared to those of the 10 district-run and the 55 factory-run colleges. In these three categories of workers' colleges, the distribution of teachers is shown in Table 13.

The numbers of teachers in all the colleges were increasing. There were 3,294 full-time teachers, 39.3 per cent of which were lecturers or above. Most of the others were originally engineers or technicians with no teaching experience at a higher educational level, and were transferred from factories or secondary technical schools. The qualifications of teachers varied widely from one college to another. In the Shanghai Municipal Spare-Time Industry College, the only one run by the municipality, 70 per cent of the teachers were lecturers or above. This proportion of qualified teachers went down to 37 per cent for the district-run colleges and 33 per cent for the factory-run colleges.

II. Detailed analysis of the ten workers' colleges

The ten workers' colleges selected for study are:

(a) The Iron and Steel Institute for Workers of Taiyuan Iron and Steel Company (Shanxi Province)

(b) The Taiyuan Workers' College of Xishan Mining Bureau (Shanxi Province)

(c) The Workers' College of Dalian Rolling Stock Plant (Liaoning Province)

(d) The Workers' College of Dalian Heavy-duty Machinery Plant (Liaoning Province)

(e) The Harbin Workers' Spare-Time College (Heilongjiang Province)

(f) The Light Industry College of Harbin Second Bureau (Heilongjiang Province)

(g) Shanghai Workers' Spare-Time College (Shanghai)

(h) The Nanshi District Workers' Spare-Time College (Shanghai)

(i) The Workers' College of Electrical Equipment Corporation (Shanghai)

(j) The Workers' College of Shanghai No. 3 Steel Plant (Shanghai)

Three of the workers' colleges were set up in 1958-1960, six in 1972-1975 and one in 1978. One of them had an enrolment of more than 2,000, two between 1,000 and 2,000, two between 500 and 700, four between 100 and 200 and one less than 100 (Table 14). The ten workers' colleges offered a total of 44 specialities. The number of specialities offered in one college varied from 1 to 10, but was generally from 3 to 5.

Table 14: Basic facts about the ten workers' colleges

	Operator of the colleges	Year start	Total Enrol.	Grad.
1	Taiyuan Iron and Steel Company	1975	703	306
2	Taiyuan Xishan Mining Bureau	1973	75	257
3	Dalian Rolling Stock Plant	1972	134	75
4	Dalian Heavy-Duty Machinery Plant	1972	144	74
5	Harbin General Workers' Union	1958	1 285	2 346
6	Harbin Second Bureau for Light Industry	1973	416	595
7	Shanghai Municipal Dept. of Higher Ed.	1960	2 636	5 755
8	Shanghai Municipal Dept. of Education	1958	1 748	1 024
9	Shanghai Electrical Equipment Corp.	1978	218	152
10	Shanghai Municipal Dept. of Met.	1974	205	208

Note: For colleges' complete names, see previous page. Enrolment figures are for end of 1983. Graduate means the total number of diploma course graduates since the college was set up.

There have been more and more units (government departments or bureaux, factories, community agencies, etc.) running various types of workers' colleges in China. The particular features, conditions of operation and organization patterns of the various colleges reflect the economic, technological and educational levels of the respective regions, government departments/bureaux and sectors, as well as the differing demand for workers' education. Comparison of the ten workers' colleges will be undertaken according to the following eight topics:

- Background and training objectives
- Entrance requirements
- Size

- Curriculum
- Teaching faculty
- Building and facilities
- Expenditures
- Leadership and management

A. Background and training objectives

Although the specific training objectives of the various operating units were different, the overall goal was by and large the same, that is, to train skilled personnel who were urgently needed in the various units to upgrade productivity. Three categories of workers' colleges can be distinguished:

- Regional workers' college
- Specialized department workers' college
- Factory-run workers' college

Regional workers' colleges

The objective of the regional workers' colleges is to train qualified personnel for local factories, mines and other medium and small enterprises. When the Shanghai Workers' Spare-Time College was set up in 1960, the primary purpose was to upgrade the standards of the skilled workers who were involved in production and technological innovation. In 1983, the training objective of that college was defined as follows:

> "The college should be geared to the needs of medium and small enterprises in the whole city and provide various professional personnel with an education equivalent to the regular specialized colleges in order to facilitate the development of production and the progress of science and technology in Shanghai."

The Shanghai Nanshi District Workers' Spare-Time College defined its objectives as:

> 'With the socialist construction and the constant development of industrial production, various technical personnel

> are urgently needed by factories, mines and other enterprises. Considering that there are many medium and small enterprises in the industrial sector and most of them lack the necessary conditions to run independently a workers' college, it is necessary to set up regional spare-time colleges.'

It is also clearly stated by the Harbin Workers' Spare-Time College that:

> "The establishment of the college results from the situation of obsolete equipment, backward technology, weak technical competence, shortage of graduates from regular universities or colleges and the lack of necessary conditions which does not allow many local factories and other enterprises to run workers' colleges independently. The purpose of the college is to train scientific and technical personnel primarily for local medium and small enterprises."

Specialized department workers' colleges

By specialized department is meant non-educational ministries (in the national government) or departments (at provincial levels). The objective of this category of workers' college is to train technical personnel for the factories, mines or other enterprises in a *specific sector.*

As an example, in Harbin, the capital city of Heilongjiang Province, there were 351 factories and enterprises within the framework of 15 companies under the auspices of the Second Bureau of Light Industry. Among them, there were 4 factories each with more than 1,000 workers and staff members, 36 factories with more than 500, and the rest less than 500. The total number of workers and staff members in these factories amounts to 110,000. The educational attainments were: 25.1 per cent with primary education, 58.2 per cent with junior secondary education, 15.2 per cent with senior secondary education and 1.5 per cent were graduates from universities or specialized colleges. The number of professionals was 1,601, which was 1.5 per cent of the total number of workers and staff members. There were 61,670 medium- or high-skilled workers (above grade 3), accounting for 56 per cent of the total. Since the average educational level of the workers and staff was comparatively low and the equipment of small-scale factories was mostly out of date, improvement of productivity could only be limited. Hence, the Second Bureau of Light Industry decided to set up a workers' college to train qualified personnel for its own factories in the city.

As another example, there were 22,000 workers and staff members in Shanghai No. 3 Iron and Steel Plant, which produced 709 types of iron and steel and 1,137 different categories of products with a total output of 1,144

million yuan RMB in 1982. However, there were only about 830 professionals in the plant. Further expansion and improvement of production were very much constrained by the lack of qualified personnel. The Shanghai Municipal Bureau for the Metallurgical Industry therefore decided to set up a workers' college in this plant in order to meet the needs for professional personnel of the plant in particular and the entire Shanghai Metallurgical Industry in general.

Factory-run workers' colleges

Factories, mines and other enterprises set up their own workers' colleges with the initial aim of training professional and technical personnel to meet their own needs.

For example, Xishan Coal Mine in Taiyuan, Shanxi Province, is one of the thirteen important mines in China. The annual output of raw coal increased rapidly from 4,840,000 tons in 1976 to 10,500,000 tons in 1982, with an average annual increase of 1,100,000 tons. By the end of 1973, there were 29,000 workers and staff members, but in 1982, the number increased to 53,500. The constant increase of coal production and the increasing degree of mechanization required a large number of skilled personnel. However, according to 1982 statistics, among the 50,000 workers, 3.2 per cent were illiterate, 32.1 per cent were with education at primary school level, 43.5 per cent with junior secondary schooling, 18.0 per cent were senior secondary school graduates and only 3.2 per cent were university graduates. Most of the engineers and technicians were graduates of colleges and technical secondary schools before 1966, and the proportion of high-skilled personnel reached only 2 per cent of the total staff. Although a large number of graduates from regular colleges and technical secondary schools had been assigned to the Xishan Mining Bureau system, the needs resulting from the expansion of production were not met.

As a further example, the main products of the Dalian Rolling Stock Plant, located in Shahekou District of Dalian City, were diesel locomotives, cars and railway fittings. There were 10,149 workers and staff members, in the following categories:

	Number
Administrators	810
Designer researchers	674
Production workers	2 828
Maintenance workers	3 753
Other workers	2 084
Total	10 149

According to the characteristics of production in the plant, the ordinary workers were required to have the level of secondary technical schooling, and the administrators were expected to have an educational level above three-year specialized college. The fact was, however, that 20 per cent of the workers and staff members had achieved the level of primary education, 57 per cent junior secondary education, 14 per cent senior secondary education and 9 per cent the level of three-year specialized college (including workers' college). This situation was far from satisfactory. The lack of manpower in such specialities as industrial management, industrial and civil engineering and thermodynamics was becoming a serious problem. From 1981 to 1983, 31 graduates of secondary technical schools and 65 graduates of three-year specialized colleges were assigned to the plant, but only 30 per cent of them majored in the specialities of diesel locomotives and internal-combustion engines, and 7.8 per cent of them majored in the machinery-manufacturing speciality. The specialized personnel for machinery- manufacture was badly needed in diesel locomotive production. Because of this, the plant established its own workers' college to train high-skilled personnel for its own needs.

B. Entrance requirements

According to the unified regulations laid down by the State, workers' colleges can admit workers and staff members under 35 years of age with an educational level of senior secondary schooling, plus two years of working experience. Acceptance is made on the basis of a unified examination held in provinces and municipalities with, however, preferential admission for model workers and key members in production. There are also a small number of workers' colleges approved by ministries or committees at the national level, which recruit students in certain specialized sectors all over the country. The students of workers' colleges pay no tuition fees and get their normal salaries when studying in the colleges. They are usually sent back to their previous work units after graduation. Table 15 shows the general admission requirements for the ten workers' colleges.

C. Size of workers' colleges

Enrolments varied with the type of workers' college, and its orientations of training. The ten workers' colleges included in the research project had a total enrolment of 7,504 in 1983. The detailed enrolment by type of college is given in Table 16.

By far, the regional workers' colleges, which possessed better training facilities and were able to own larger pieces of equipment, had the highest enrolment. The specialized department workers' colleges were smaller in

Table 15: Entrance requirements in workers' colleges

Educational level required	Age	Working experience	Form of examination	Duration and mode of study
Regional Workers' Colleges				
Shanghai Spare-Time College				
- Senior secondary	35	2-3 years	Municipal	3/4 yrs Dip./Deg.
Nanshi District Spare-Time College				
- Senior secondary	-	2 years	Municipal	Dip.
Harbin Spare-Time College				
- Senior secondary	35	2 years	Municipal	4 years Dip. (half work, half study)
Specialized Department Workers' Colleges				
Harbin Light Industry College				
- Junior secondary	30	2 years	Municipal	3 years Dip. (off-job)
Shanghai Electrical Equipment College				
- Senior secondary	30	2 years	Municipal	3 years Dip. (off-job)
Shanghai Steel Plant College				
- Senior secondary	30	2 years	Municipal	3 years Dip. (off-job)
Factory-run Workers' Colleges				
Taiyuan Iron and Steel College				
- Senior secondary	30	2 years	Provincial	3 years Dip. (off-job)
Dalian Heavy Machinery Plant College				
- Senior secondary	35	2 years	Provincial	3 years Dip. (off-job) 4 years Dip. (spare-time)
Dalian Rolling Stock Plant College				
- Senior secondary	35	2 years	Held by Ministry	3 years Dip. (off-job)
Taiyuan Xishan Mining College				
- Senior secondary	30	2 years	Provincial	3 years Dip.

Table 16: Enrolment at workers' colleges by category

	Enrolment	%
Regional Workers' Colleges		
Shanghai Spare-Time College	2 636	34.8
Nanshi Dist. Spare-Time College	1 748	23.8
Harbin Spare-Time College	1 285	17.0
Sub-total	5 669	74.9
Specialized Department Workers' Colleges		
Harbin Light Industry College	416	5.5
Shanghai Elect. Equip. College	218	2.9
Shanghai Steel Plant College	205	2.7
Sub-total	839	11.1
Factory-run Workers' Colleges		
Taiyuan Iron and Steel College	703	9.3
Dalian Heavy Mach. Plant College	144	1.9
Dalian Rolling Stock Plant College	134	1.8
Taiyuan Xishan Mining College	75	1.0
Sub-total	1 056	14.0
Grand total	7 564	100.0

size. The factory-run workers' colleges, in general, were small in scale, with the noticeable exception of Taiyuan Iron and Steel Company Workers' College, where enrolment reached 703.

Given the large range of enrolments, it became necessary to specify the basic criteria to justify the creation of a workers' college:

(a) meeting the needs of workers in the neighbourhood;

(b) guaranteed quality of teaching;

(c) efficient use of time and money;

(d) contributions from the enterprises concerned.

Under all kinds of local constraints, the strategy was to gain the best economic return from investment in workers' higher education. On the whole, the regional workers' colleges, which provide training for the local small and medium enterprises were larger in size, geographically better located, better equipped, and had more experience. They were more likely to achieve more. In 1983, 10.5 per cent of the workers' colleges were regional colleges, but their enrolment reached 37 per cent of the total. It is probable that colleges of this category will increase faster in the future.

D. Curriculum

In 1983, the ten workers' colleges offered 44 specialities (43 related to engineering and one to liberal arts). The engineering specialities can be subdivided into:

Machine building and related technology : 10

Electronics and automation : 15

Chemical, metallurgical and other technology : 18

The detailed information about the specialities offered by each of the ten workers' colleges is given in Table 17.

Obviously, the regional workers' colleges which had a higher number of students drawn from many small- and medium-size enterprises could offer a larger range of specialities. The factory-run workers' colleges were more specialized and offered fewer specialities since their objective was to satisfy the specific needs of the enterprise upon which they were dependent.

Table 17: Specialities offered in the ten Workers' Colleges

	Specialities	Number of courses	Total class hours
Regional Workers' Colleges			
Shanghai Spare-time College (a)	Industrial automation Automatic measurement Microcomputer in industrial automation Application of computer Data processing Metallurgy Metallography Technology and equipment for machinery Thermodynamics Plastics processing Organic chemistry engineering Quality management	15	2 278
Nanshi District Spare-Time College (b)	Technology and equipment for machine-building	19	2 280
	Electrical automation	17	2 100
	Chinese language and literature	12	1 680
Harbin Spare-Time College	Technology and equipment for machine-building	25	2 790
	Automatic Control Electronic technique Industrial and civil design Chemical analysis Industry and enterprise management	21	2 685
Specialized Department Workers' Colleges			
Harbin Light Industry College (c)	Light industry equipment	21	2 430
	Industrial automation	22	2 310
	Plastic processing	22	2 370
	Woodworking equipment	22	2 534
	Civil electrical equipmener	22	2 900
	Industrial arts	22	2 900

Shanghai Electrical Equipment College	Design and manufacture of electrical equipment	14	2 368
	Design and manufacture of cast models	15	2 265
	Industrial electricity (d)		
Shanghai Steel Plant College	Electrical automation	21	2 450
	Machines for metallurgy industry	21	2 340
	Steel-rolling technology	20	2 345
	Industry accounting	21	2 340
Factory-run Workers' Colleges			
Taiyuan Iron and Steel College	Machinery and equipment for metallurgical industry	20	2 278
	Industrial automation	25	2 458
	Steel rollingiron	18	2 045
	and steel metallurty	19	2 161
Dalian Heavy Machinery Plant College	Technology and equipment for machinery manufacture	20	2 380
Dalian Rolling Stock Plant College (e)	Technology and equipment for machine-building	21	2 094
Taiyuan Mining College (f)	Multiple coal mining	20	2 120
	Mine geology	21	2 180

Notes:

(a) There are a few single courses offered in the college.

(b) There used to be specialities of civil engineering, chemistry, enterprise management, which have been discontinued.

(c) Special training classes on Furniture Design, Clothes Design and Foreign Languages used to be attached to the college. At present, some radio/TV and correspondence professional classes are attached to the college.

(d) Automation.

(e) Radio/TV, industrial accounting and cadre training classes are attachted to the college.

(f) There used to be specialities in machinery and electrical engineering, civil engineering, automation, and Japanese. Now radio/TV and correspondence classes are attached to the college.

The following are the basic principles that curriculum designers for workers' colleges are supposed to follow:

1. The principle of relevance

The workers' colleges designed the specialities and curricula according to the needs of the production sector. They also took into account their own resources in terms of teaching staff, facilities, equipment, etc. with the hope of maximizing the resources available. Moreover, each college might still like to develop its own distinctive characteristics. As far as the instruction is concerned, it was not always possible to adopt indiscriminately the materials developed for the regular colleges, because it was the job of the workers' colleges to meet local special needs. For example, in the speciality of 'metallurgical machinery and equipment', the Iron and Steel Workers' College (run by the Taiyuan Iron and Steel Company) added new items on 'hydraulic pressure system' to its course on 'hydraulic transmission'; the Harbin Workers' College for light industry revised the conventional programme in the speciality 'machinery for light industry' by reducing the part on 'machine-tool design' and expanding the part on 'refrigeration'. Such practice deviates from the convention in regular institutions of higher education where people may use different texts but stick to an identical syllabus.

2. The principle of flexibility

The non-educational government departments and enterprises which run workers' colleges were given full autonomy to decide the specialities to be offered. For example, there had been nine specialities in Taiyuan Workers' College of Xishan Mining Bureau, but these were reduced to two because the other specialities were either no longer needed or were offered by other workers' colleges. In 1983, there were four specialities in the Taiyuan Iron and Steel Workers' College, but in 1985, new specialities in 'industrial and civil engineering', 'enterprise management', 'heating and ventilation' were added, all due to the college's own planning. This again moved away from the convention where changes in the specialities needed to be consistent with some central plan. The colleges were also allowed to modify to some extent the lecture hours and the emphasis among the theoretical, basic technical and practical courses. Although the central Ministry of Education set uniform requirements for each speciality, its course structure and lecture hours, the local educational authorities, the specialized departments and enterprises which run workers' colleges still had the flexibility.

3. The principle of democratic consultation

In determining their specialities and curricula, the workers' colleges adopted what was called the procedures of democratic consultation. Workers' colleges by and large followed the administrative structure of an ordinary higher education institution in China. There was the President; there was also a Dean of Teaching Affairs who took care of different subject departments, normally called 'departments of teaching and research'. Generally speaking, the procedure was as follows. The President of the college drafted a preliminary proposal after consulting the enterprise administrators who were in charge of staff training. Then the President, the Dean and the various department heads discussed and worked out a detailed programme plan. On the basis of this programme plan, teachers in different teaching departments held special meetings to plan out the detailed content and schedules of the different courses. Finally, once the administrative committee of the college endorsed the proposals, the President of the college submitted it to the relevant higher authorities for approval. This was more or less the normal procedure taken by any institution of higher education, but the participation of the enterprises was somehow unique to workers' colleges.

4. The principle of practicality

Apart from the fact that workers' colleges bore extremely pragmatic objectives, they were also characterized by their students who were all experienced workers. There was therefore a particular emphasis in the applicability of the courses in reality. Students were given more opportunity to learn on their own and to learn from one another. There was also emphasis on practical experience and fieldwork. As a matter of fact, most of the topics chosen for graduation projects were generated from urgent technical problems existing in real production. There was a general expectation that graduates of workers' colleges should be capable of solving real-life problems.

'Technology and equipment for machine manufacture' was a common programme in many workers' colleges. By comparing the curriculum guidelines issued by the Ministry of Education with those used by four workers' colleges, we may find that the latter were very much enriched and pragmatic in nature. According to the Ministry of Education regulations for three-year specialized colleges, the educational objectives of this speciality were to train skilled technicians with the educational level of a diploma-course. The students were required to master the basic theories, the technical knowledge and the skills necessary in the speciality. The workers' colleges, however, required the students to understand the technological process, to know the principles of operation, to analyze and to solve general technological problems of production. They should be able to

design technological and special-purpose machines or equipment, to constantly renew their knowledge in related areas of science and technology, and to read professional books and reference materials in one foreign language. They should also have some understanding of the issues in enterprise management. After graduation, it was expected that the students be able to analyze and solve technological problems on work sites, monitor the production technology, conceive and design new technological processes and equipment, and work out the procedure and methods of product inspection and quality control.

The information presented in Table 18 calls for the following clarification and comments:

The lecture hours were actually 'contact hours' which include only lectures, laboratory periods and group discussions. In addition, students take leave to carry out their fieldwork (7 weeks) and graduate project (13 weeks).

The table demonstrates the degree to which the workers' colleges could deviate from conforming to the centralized plan and the extent to which they could exercise flexibility.

Courses more practical in nature were given more weight than the Ministry of Education had stipulated. Examples were 'descriptive geometry and technical drawing', 'theoretical mechanics', 'strength of materials', 'theory of machinery', etc. Lecture hours in these areas exceeded, in general, the number of hours suggested by the Ministry of Education.

The workers' colleges could include additional courses or eliminate conventional courses at their discretion. For example, Shanghai Nanshi District Spare-Time College skipped courses in 'metal technology', 'electrical control of machinery' and 'fixture design', and added 'engineering mathematics' and 'algorithm and computer languages' to their programmes. The Harbin Second Bureau of Light Industry Workers' College eliminated some courses such as 'metal technology', 'industrial and enterprise management', and added courses such as 'general chemistry' and 'conversion theory and technical measurement'.

Some colleges merged two closely-related courses into one. For example, the Workers' College of Dalian Heavy-Duty Machinery Plant merged the course of 'fixture design' with the course on 'technology of machine-manufacture'.

E. Teaching Staff

The wide range of courses offered by workers' colleges rendered it difficult for them to rely totally on full-time teachers. Anyway, it would be impossible for workers' colleges to find enough full-time qualified teachers and to financially support a staff that was entirely full-time. Most workers' colleges recruited some full-time teachers, to whom they paid a fixed

Table 18: **Comparisons of the study programme (courses and lecture hours) in the speciality of technology and equipment for machine-manufacture in some workers' colleges.**

Courses		Study plan issued by Ministry of Education (1983)		Name of College			
		released from work (3 years)	spare-time (4 years)	Shanghai Nanshi District Workers' Spare-Time College	Dalian Rolling and Stock Plant College	Dalian Heavy-Duty Machinery Plant Workers' College	Harbin Second Bureau of Light Industry Workers' College
1.	Political theory	129	-	-	129	120	120
2.	Physical education	110	-	-	120	120	120
3.	Foreign languages	230	220	240	230	300	240
4.	Advanced mathematics	200	220	260	200	240	280
5.	General physics	168	180	200	168	160	160
6.	Descriptive geometry and technical drawing	148	160	200	148	150	160
7.	Metal technology	37	40	-	37	70	-
8.	Theoretical mechanics	92	190	120	92	120	120
9.	Mechanics of material	92	100	120	92	120	120
10.	Principle theory of machinery	92	90	100	92	120	90
11.	Components and parts of machinery	92	90	140	92	128	120
12.	Metal material and heat treatment	55	60	60	55	60	60
13.	Tolerance, co-ordination and technical measurement	55	50	40	55	40	-
14.	Industrial and enterprise management	34	40	80	34	-	-
15.	Electrical engineering	129	140	180	129	150	200
16.	Theory and tools of metal cutting	74	70	80	74	80	60
17.	Electrical control of machinery	34	40	-	34	40	-
18.	Design of cutting machine	102	100	10	102	90	90
19.	Technology of machine-building	86	70	80	86	140	80
20.	Design of fixtures	51	40	-	51	-	60
21.	Hydraulic transmission	74	80	120	74	72	80
Optional courses							
1.	General chemistry	-	-	-	-	60	60
2.	Engineering mathematics	-	-	80			
3.	Theory of conversion and technical measurement	-	-	-	-	-	60
4.	Algorithm and computer language	-	-	80	-	-	100
5.	Theory of automatic regulation	-	-	-	-	-	50
	Total	2 080	1 980	2 280	2 094	2 380	2 430

salary, together with all fringe benefits, and offered professional titles. They also invited and appointed part-time teachers who were usually lecturers or engineers elsewhere, and paid them according to the type of courses and the number of lectures. Part-time teachers were not given professional titles. The following looks more closely at the staffing in workers' colleges.

1. Teacher/student ratio

At the time of survey, there were a total of 864 full-time teachers and 228 part-time teachers in the ten workers' colleges under study . The average ratio between full-time teachers and students was 1 : 8.8. There were no statistics which took into account the part-time teachers as full-time equivalents.

In fact, there was a large variation between the ten colleges, as can be seen from Table 19. The number of students per full-time teacher varied from 3.4 in Taiyuan Xishan Mining College to 32.1 in Harbin Spare-Time College. This is not a very meaningful comparison because it has not taken into account the part-time teachers who contributed significantly to teaching. It may be said, however, that in some colleges like Shanghai Electrical Equipment College, Shanghai Steel Plant College and Taiyuan Xishan Mining College the number of students per full-time teacher was rather low.

2. Qualification of teachers

Over 95 per cent of the full-time teachers were graduates. They possessed either a degree or a diploma. A few of them obtained the qualification through independent study. Teacher qualifications again varied from college to college. Colleges with a longer history, with a larger teaching staff, or which recruit from a larger region tend to recruit teachers of higher qualifications. The teacher qualifications in colleges run by large enterprises were also higher. The details of the qualifications of full-time teachers in the ten workers' colleges are shown in Table 20.

3. Teacher experience

Teacher experience refers to the number of years the full-time teachers had been engaged in teaching, training or other work before they came to the college. Most of those with teaching experience had taught in other workers' colleges, higher educational institutions or technical secondary schools. Some teachers had been professionals in factories or enterprises and were transferred to the colleges. Half of the teachers in the ten workers' colleges had a teaching or working experience of five years or less. Indeed, quite a large number of them were recent graduates from universities and colleges (Table 21).

Table 19: Students per full-time teacher

	No. of full-time teachers	Enrolment	Students per full-time teacher
Regional Workers' Colleges			
Shanghai Spare-Time College	454	2 636	5.8
Nanshi Dist. Spare-Time College	78	1 748	22.4
Harbin Spare-Time College	40	1 285	32.1
Specialized Department Workers' Colleges			
Harbin Light Industry College	43	416	9.7
Shanghai Electrical Equipment College	44	218	5.0
Shanghai Steel Plant College	55	205	3.7
Factory-run Workers' Colleges			
Taiyuan Iron and Steel College	88	703	8.0
Dalian Heavy Machinery Plant College	20	144	7.2
Dalian Rolling Stock Plant College	20	134	6.7
Taiyuan Xishan Mining College	22	75	3.4
Total	864	7 564	8.8

4. Professional titles

There are four officially recognized professional titles for teachers in workers' colleges: professor, associate professor, lecturer and assistant lecturer . They may be granted to full-time teachers in workers' colleges which were formally approved by and officially registered with the Ministry of Education. Teachers who were not assessed and granted a professional title were called 'instructor'. Teachers who did not have a university degree or a diploma from a specialized college could also be assessed and granted

Table 20: Qualifications of full-time teachers

	No. of teachers	Grad. reg. coll.	Grad. voc. coll.	Equiv. voc. coll.	Tech. sec. school
Regional Workers' Colleges					
Shanghai Spare-Time College	454	365	82	7	-
Nanshi Dist. Spare-Time College	78	60	17	1	-
Harbin Spare-Time College	40	32	8	-	-
Specialized Department Workers' Colleges					
Harbin Light Industry College	43	31	6	-	6
Shanghai Elect. Equip. College	44	26	16	2	-
Shanghai Steel Plant College	55	32	18	5	-
Factory-run Workers' Colleges					
Taiyuan Iron and Steel College	88	76	8	2	2
Dalian Heavy Machin. Plant College	20	17	3	-	-
Dalian Rolling Stock Plant College	20	17	3	-	2
Taiyuan Xishan Mining College	22	12	8	-	2
Total	864	668	169	17	10

professional titles, provided they passed examinations to show that they had reached the equivalent level of education.

Out of the 864 full-time teachers of the ten workers' colleges, 673 held professional titles, i.e. 78 per cent of the total teaching staff; 508 teachers held the title of lecturer (including engineer) or above, i.e. 58.7 per cent of the total. The regional colleges had the highest proportion of teachers with professional titles (66 per cent), followed by the colleges run by specialized departments (40 per cent), then the factory-run colleges (25 per cent) (Table 22). Professional titles were granted giving due considera-

Table 21: Teaching/working experience of full-time teachers in the ten workers' colleges

	Total	5 yrs or less	6 yrs or more
Regional Workers' Colleges			
Shanghai Spare-Time College	454	298	156
Nanshi District Spare-Time College	78	34	44
Harbin Spare-Time College	40	8	-
Specialized Department Workers' Colleges			
Harbin Light Industry College	43	34	9
Shanghai Elect. Equip. College	44	12	32
Shanghai Steel Plant College	55	9	46
Factory-run Workers' Colleges			
Taiyuan Iron and Steel College	88	49	39
Dalian Heavy Machin. Plant College	20	5	15
Dalian Rolling Stock Plant College	20	1	19
Taiyuan Xishan Mining College	22	9	13
Total	864	459	405

tion to the following factors: qualification, experience, teaching/training ability and teaching effectiveness. Generally, the assessment procedure started with discussions by the candidate's peers in the same department. The discussion usually concentrated on the candidate's performance. There was then a College Committee for Title Appraisal which compiled a summary report and presented a proposal to the responsible government department for approval. For the granting of professorship and associate professorship, approval at the provincial level was necessary.

Table 22: Professional title of full-time teachers in the ten workers' colleges

	No. of teachers	Assoc. prof.	Lect-urers	Engin-eers	Asst. Lect.	Asst. Eng.	Instr-uctors
Regional Workers' Colleges							
Shanghai Spare-Time College	454	15	306	-	53	-	80
Nanshi Dist. Spare-Time College	78	-	36	-	-	-	42
Harbin Spare-Time College	40	2	18	-	19	-	1
Specialized Dept. Workers' Colleges							
Harbin Light Industry College	43	1	14	-	20	5	3
Shanghai Elect. Equip. College	44	-	22	-	2	-	20
Shanghai Steel Plant College	55	-	21	8	18	-	8
Factory-run Workers' Colleges							
Taiyuan Iron and Steel College	88	-	20	14	27	4	23
Dalian Heavy Mach. Plant College	20	-	6	4	6	-	4
Dalian Rolling Stock Plant College	20	2	10	3	4	1	-
Taiyuan Xishan Mining College	22	-	-	6	-	6	10
Total	864	20	453	35	149	16	191

5. Salaries

In 1983, the salaries of full-time teachers in workers' colleges were comparatively low. About 40 per cent of teachers in the ten workers' colleges received a monthly salary of less than 80 yuan RMB (Table 23). The salaries were closely related to educational qualifications and working experience, but not to professional titles. Teachers' salaries have been significantly revised since, but the entire salary structure is still under drastic reform.

6. Workload

The full-time teachers in workers' colleges taught an average of four to six lecture hours a week. In addition, they spend about ten hours a week in after-class activities such as guidance of students, preparation of experiments, correcting papers, all sorts of administrative work, and so on.

F. School buildings and facilities

There has been a graduai increase in capital investments in recent years. This has led to some improvement in the environment for teaching and learning. As far as the ten colleges are concerned, there was again great variation in the quality of school buildings and facilities. The survey shows however that all ten workers' colleges seem to possess the basic physical conditions they would require. The detailed distribution of school buildings and workshops of the ten workers' colleges is given in Table 24.

Because of the different nature of these workers' colleges and the different study programmes they offer, it is not always possible to draw meaningful comparison from the data. Nevertheless, two rather rough indicators, floor space per student and number of students per general classroom, are compared in Table 25, and can at least show the disparity that exists among colleges.

The floor space per student varied from 1.8 square metres in Nanshi District Spare-Time College to 26.7 square metres in Taiyuan Xishan Mining College. The two colleges again hold the extreme values for the number of students per general classroom: 92 students per classroom for the former and 7 for the latter.

These two indicators are just crude figures and should be interpreted with much caution; they do, however, bear significant costing and utility implications. In factory-run colleges, for example, the buildings could be used for teaching as well as for other purposes.

Table 23: Distribution of teachers by salary levels in the ten workers' colleges (Yuan RMB)

	No. of teachers	50-80 yuan	81-100 yuan	101-150 yuan	Over 150 yuan
Regional Workers' Colleges					
Shanghai Spare-Time College	454	20.9	67.6	5.7	1.8
Nanshi Dist. Spare-Time College	78	32.1	50.0	17.9	-
Harbin Spare-Time College	40	60.0	40.0	-	-
Specialized Dept. Workers' Colleges					
Harbin Light Industry College	43	69.8	23.3	7.0	-
Shanghai Elect. Equip. College	44	40.9	54.5	4.5	
Shanghai Steel Plant College	55	89.1	9.1	1.8	-
Factory-run Workers' Colleges					
Taiyuan Iron and Steel College	88	53.4	33.0	13.6	-
Dalian Heavy Mach. Plant College	20	80.0	20.0	-	-
Dalian Rolling Stock Plant College	20	35.0	10.0	5.0	-
Taiyuan Xishan Mining College	22	86.4	13.6	-	-
Total	864	39.4	50.8	8.9	0.9

Table 24: School buildings and workshops in ten workers' colleges

	Total floor space (m^2)	Total No. of rooms	No. of class-rooms	No. of offices	No. of libraries	No. of reference rooms	No. of labs.	No. of students
Regional Workers' Colleges								
- Shanghai Spare-Time College	23 000	194	70	90	7	-	27	2 636
- Nanshi District Spare-Time College	3 149	37	19	10	1	1	6	1 748
- Harbin Spare-time College	5 900	44	23	15	1	-	5	1 285
Specialized Department Workers' Colleges								
- Harbin Light Industry College	1 581	33	11	19	1	-	2	416
- Shanghai Elect. Equip. College	2 424	33	11	19	1	-	2	218
- Shanghai Steel Plant College	1 000	25	10	12	2	-	1	205
Factory-run Workers' Colleges								
- Taiyuan Iron and Steel College	2 600	29	13	11	1	1	3	703
- Dalian Heavy Mach. Plant College	800	12	4	5	1	-	2	144
- Dalian Rolling Stock Plant College	2 100	23	7	11	1	1	3	134
- Taiyuan Xishan Mining College	2 000	25	11	10	1	1	2	75

Table 25: Floor space per student and number of students per general classroom in the ten workers' colleges

	Floor space per student (m2)	Number of students per classroom
Regional Workers' Colleges		
Shanghai Spare-Time College	8.7	37.7
Nanshi District Spare-Time College	1.8	92.0
Harbin Spare-Time College	4.6	55.9
Specialized Department Workers' Colleges		
Harbin Light Industry College	3.8	37.8
Shanghai Elect. Equip. College	11.1	19.8
Shanghai Steel Plant College	4.9	20.5
Factory-run Workers' Colleges		
Taiyuan Iron and Steel College	3.7	54.1
Dalian Heavy Machin. Plant College	5.6	36.0
Dalian Rolling Stock Plant College	15.7	19.1
Taiyuan Xishan Mining College	26.7	6.8

G. Finance

The workers' colleges were financed in different ways by different sources.

Regional workers' colleges were run by regional educational departments. They were financed by government funds and students' tuition fees. The larger part of the tuition fees were paid by factories and enterprises. The government contribution usually amounted to 80 per cent of the college's income, and tuition made up the remaining 20 per cent.

The recurrent expenditures of the factory-run colleges were paid by the enterprises, under the heading of 'staff training' expenditures, which

was usually 1.5 per cent of the total expenditures on salary of the enterprise.

The specialized non-educational departments which operate workers' colleges usually financed these colleges by raising funds from factories and enterprises under the respective departments. The money was then spent according to standard formulas.

As for colleges run by trade unions, the unions usually set aside a certain amount of membership subscriptions for educational purposes. This was in turn transferred to the colleges. In addition, the colleges might also collect tuition fees.

Until very recently, investment in education was not given high priority and the workers' colleges also suffered. How the shortage of funds affected the effectiveness of workers' colleges is noticeable, because this would point to the directions of improving the cost-effectiveness of workers' colleges. Unfortunately, for a number of reasons, comprehensive and accurate information on past investments of the ten workers' colleges (since they were set up) is lacking.

As the ten colleges belonged to different categories, were established at different times and were of different sizes, the capital investment and recurrent expenditures vary greatly. Comparisons again carry little meaning.

Recurrent expenditures were mainly related to the salaries and benefits of teachers, teaching materials, management expenses and maintenance of school buildings. For example, Harbin Workers' Spare-Time College received in 1982 the amount of 63,000 yuan RMB, of which 12,000 yuan were used for salaries of the full-time teachers, 18,000 for payment to part-time teachers, 8,000 for teaching materials, 3,000 for management costs, 12,000 yuan were used for maintenance of school buildings and 10,000 for purchasing equipment and instruments. To this, of course, one should add the salary received by the worker (depending upon whether he follows a 'half working, half studying' programme or was released for full-time study) while he was attending the college.

Table 26 gives the average teaching cost of a graduate in the ten workers' colleges. The cost varied from college to college (from 2,230 yuan to 4,200 yuan), and even from programme to programme within the same college. In Harbin Workers' Spare-Time College, for instance, the cost of a graduate was 3,185 yuan in 'automatic control', 2,835 in 'machine-manufacture' and 2,455 in 'industrial and civil engineering'.

In general terms it may be said, however, that the average cost of a graduate depended upon the size of the college. It was in the regional workers' colleges that the cost was the lowest, ranging from 2,230 to 2,812 yuan. Regional workers' colleges had larger enrolments since they recruit students from a large number of enterprises. The cost of the factory-run workers' colleges was the highest, ranging from 2,862 to 4,200 yuan. It was also in these colleges that enrolment was the lowest. The specialized

Table 26: The comparison of average educational cost of a graduate in the ten workers' colleges

	Average cost (in yuan RMB)	Enrolment
Regional Workers' Colleges		
Shanghai Spare-Time College	2 486	2 636
Nanshi Distict Spare-Time College	2 230	1 748
Harbin Spare-Time College	2 812	1 285
Specialized Department Workers' Colleges		
Harbin Light Industry College	3 570	416
Shanghai Elect. Equip. College	2 921	218
Shanghai Steel Plant College	3 025	205
Factory-run Workers' Colleges		
Taiyuan Iron and Steel College	4 200	703
Dalian Heavy Machin. Plant College	3 400	144
Dalian Rolling Stock Plant College	2 862	134
Taiyuan Xishan Mining College	3 377	75

department workers' colleges were, as expected, in the middle, with an average cost of graduates ranging from 2,921 to 3,470 yuan.

H. Leadership and management

The workers' colleges in China operate under the leadership and administration of the national ministries, local governments (provinces/municipalities, counties, cities) and sponsoring units. There is a wide range of levels of administration.

1. Administration at the central level

The Ministry of Education (as was the case in 1983) was the central administration responsible for the workers' colleges. Its main responsiblity was (a) to work out general policies and specific directives for workers' colleges, (b) to assess and approve the opening of new ones, and (c) to administer the general curriculum and teaching in the colleges, with the supporting publications, teacher training, etc. The All-China Federation of Trade Unions oversaw the administration and development of workers' colleges sponsored by the trade unions. The National Management Committee of Workers' Education. was a co-ordinating institution of workers' colleges and workers' education, responsible for working out the major principles and policies, drawing long-term plans and co-ordinating the resources and relevant activities for workers' colleges and workers' education in general. The committee members came from the State Economy Commission, the Ministry of Education, the All-China Federation of Trade Unions, the Communist Youth League and other departments or committees at the central level. The committee was supported by an office which executed its decisions.

2. Administration at the local level

At the local level (province/municipality, counties, cities), workers' colleges were taken care of by local departments of education, local non-educational bureaux, trade unions and workers' education management committees at different levels.

3. Management at the institutional level

The management of workers' colleges at the institutional level again depends on the nature and size of the colleges.

Regional workers' colleges

Shanghai Workers' Spare-Time College, for example, was sponsored by the Shanghai Municipal Bureau of Higher Education which was in charge of the direct administration of the college. The Bureau provided the college with administrators, delivered funds, approved enrolment plans and specialities, monitored and approved the appointment of teachers, evaluated teaching activities, and so on. The colleges reported regularly on their own work to the Bureau and received supervision in return. On the other hand, Harbin Workers' Spare-Time College operated under the administration of the Harbin General Trade Unions, which practically took care of the planning, admissions policy, speciality design, teacher appointment, purchase of equipment, allocation of funds, etc.

Workers' colleges run by specialized departments

The Light Industrial College of Harbin belongs to this category. It was managed directly by the Second Bureau of Light Industry of the Heilongjiang Province.

Workers' colleges run by enterprises

The Workers' Iron and Steel College of Taiyuan is an example. It was managed directly by the Taiyuan Iron and Steel Company. The day-to-day running of workers' colleges was managed by the colleges themselves, within the policy framework laid down by higher authorities. At the end of each school term or year, the colleges prepared a summary report of their work and proposed a work plan for the next term or year. Both the report and the plan were submitted to the education authority at an appropriate level. Sequentially, the local authorities reported to the relevant bodies who took care of workers' colleges in the central government.

III. Characteristics and developing trends of the three types of colleges

The emergence and development of the three types of workers' colleges were very much led by the changing needs in the community. Each category had its own strengths and weaknesses.

A. The regional colleges

(1) They were usually established for a longer time. They had more experience and better facilities. The colleges were more carefully located and hence attracted larger enrolments. In 1983, there were 82 regional workers' colleges out of a total of 784 workers' colleges all over the country, i.e. a little more than 10 per cent. Their enrolment, however, accounted for 37 per cent of the total enrolment.

(2) The regional colleges provided training for all local enterprises, especially the medium- and small-scale enterprises. Hence they had a larger variety and a more constant source of recruits.

(3) The regional colleges served to solve the problems of medium- and small-scale enterprises that were urgently in need of trained manpower but did not have the necessary resources to run training of their own.

(4) There is a greater variety in the specialities offered by regional colleges; this in effect provided a better match between teaching and the specific needs in various enterprises. They could therefore closely gear themselves to the needs of the medium and small enterprises. In Harbin Workers' Spare-Time College, for example, there were 1,200 students and 95 per cent of them came from medium or small enterprises. As a matter of consequence, the colleges and their graduates were well received by the enterprises.

(5) Regional colleges usually offer both spare-time and part-time programmes. There are therefore more opportunities for those who are eager to learn but have difficulties in obtaining leave from their work.

(6) Because of their higher enrolment, regional colleges were able to make more efficient use of their resources. As we have seen, the teaching cost of a graduate from this kind of college was the least among the three types.

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It might be said that the regional workers' colleges were more economical and exerted a greater influence in the development of workers' higher education. It is likely that workers' colleges of this type will attract more resources in the coming future.

B. Workers' colleges run by specialized departments

This type of workers' college evolved from colleges originally run by individual factories or enterprises. They became gradually larger colleges and were taken over by the relevant sectoral departments at a higher level.

This enabled a pooling together of the human, physical and financial resources of the affiliated factories and enterprises within the sectors and helped to meet the special needs of the sector. This avoided the uneconomical use of resources when, for example, only one or two classes were run by an individual enterprise.

The colleges run by specialized departments are geared to the urgent needs of actual production. The entire idea was to adapt the colleges to the specific manpower needs of the sector. It enabled an integration of manpower planning with production planning. In the end it was the hope of the entire sector to train the manpower for its own specific needs.

These colleges also had diverse sources of potential recruits and could always find the required quantity and quality of trainees. Every year they recruited through the entrance examination and were in general satisfied with the quality of the intake.

However, the colleges run by specialized departments had to face their own problems. Co-ordination was often the issue. For example, the finance of the colleges was supported by pooling together the 'staff training' funds originally allocated to individual factories and enterprises. Those factories and enterprises that did not send students to the colleges were often reluctant to contribute. This considerably affected the financial stability of the colleges. Besides, the specialized feature of the sector might create problems as regards diversity. Sometimes, the sectoral department was able to organize only limited categories of specialities that could not suit the highly diverse needs identified by the vast number of factories and enterprises in the sector.

C. Workers' colleges run by enterprises

This type of workers' college could only be organized by very large factories and enterprises which had over twenty or thirty thousand workers and staff members and possessed a certain capacity for training.

The students came from the enterprises themselves and the specialities offered were more flexible since they were set up according to the specific needs of the factories at specific times.

After graduation the students went back to work in the enterprises. Therefore, they had clear study objectives and were well prepared to apply what they had learnt to the reality in production.

Because the enterprises were training their own manpower, which they would subsequently use, they benefited directly from the training programmes. These colleges therefore naturally received more attention from the administrators of the enterprises. Practical problems such as funding and staffing were often more easily solved than for the other types of workers' colleges.

However, the narrowness in the range of programmes that could be offered often posed problems of flexibility to enterprise-operated colleges. When manpower needs in a certain area were fulfilled, the college was expected to switch to new programmes for a new type of manpower. College administrators and teachers often found it extremely difficult to adapt themselves to this change. There were also problems with the facilities and equipment which were not easily converted to suit the new programmes.

Furthermore, the design of the colleges limited their scope of recruitment. The enrolment was meant to be small; efficiency and utility were bound to suffer.

Each of these three categories of workers' colleges had its strong points and its own role to play in training qualified manpower. It is possible that, as time lapses, they may be further developed to complement each other. The trend in 1983 seemed to suggest that there would be a higher potential for the further development of regional colleges. Nevertheless, the large factories and enterprises were more and more in favour of united efforts in workers' education. In quite a number of places, the large factories and enterprises set up workers' educational centres which included workers' secondary schools and the workers' technical schools. In so doing, they have created favourable conditions for the further development of workers' colleges. Medium and small enterprises, that had difficulties in running separate colleges, tended to rely upon workers' colleges run by the specialized departments and organized as joint ventures between several factories and enterprises.

Part 3
Comparative analysis of workers' colleges and the regular specialized colleges

Although they are organized in different ways and admit different categories of students, the workers' colleges and the regular specialized colleges are, in fact, institutions providing the same level of education and offering very similar study programmes. It is therefore interesting to compare these two types of institutions.

We shall begin by analyzing the institutions themselves, and discuss their study programmes and levels of cost and expenditure. We shall then make a more thorough analysis of their graduates with particular attention on the occupations and responsibilities they held after graduation. Unless otherwise stated, situations refer to those in 1983.

I. Workers' colleges and regular specialized colleges

The educational objective of workers' colleges was the same as that of regular specialized colleges. There were, however, some differences in their study programmes.

The students of regular specialized colleges were admitted directly after completion of senior secondary education. The students of workers' colleges were admitted after having worked for several years. The educational backgrounds and cognitive levels of the latter were more heterogeneous.

In addition, the students from regular specialized colleges were recruited according to a national admission scheme. After graduation they were assigned to a large variety of posts in all kinds of enterprises. It might happen therefore that what the graduates learned in college did not correspond exactly to the requirements of their work. The workers' colleges did not depend upon the national admission scheme. They had their own admission policy. They designed their own plan of study programmes. The graduates of workers' colleges, in general, went back to the enterprises where they had come from and were assigned a specific post. The training organized in the workers' colleges was therefore more enterprise-oriented.

A. Study programmes

1. Course duration

Students of regular specialized colleges were all residential. The duration of diploma courses was normally three years. In the workers' colleges the students were mostly non-residential. The duration of courses varied from three to four years. Often the workers were released from their jobs and the course duration was three years. That was the case for the Harbin Light Industry College, the Shanghai Electrical Equipment College, the Shanghai Steel Plant College, the Taiyuan Iron and Steel Company College and the Taiyuan Xishan Mining College. Some colleges organized both the programme for released workers and the 'half working, half studying'

programmes as well (Dalian Heavy Machinery Plant College and Dalian Rolling Stock Plant College). Others offered only 'half working, half studying' programmes (Nanshi District Spare-Time College and Harbin Spare-Time College).

2. Programmes and curricula

The curriculum of regular specialized colleges was designed to suit a large variety of needs. Students were required to acquire a strong theoretical foundation, a wide knowledge in the basic technical subjects, and to develop their capacity to adapt to various situations. The workers' colleges in general adopt the study programmes and syllabuses of regular specialized colleges as a basic framework and make necessary adjustments, additions and deletions.

Table 27 may serve to illustrate the situation. The speciality of 'industrial automation' is used as an example. It shows the differences between a workers' college (in this case, the Shanghai Workers' Spare-Time College) and a regular specialized college (the Shanghai Textile College).

The total number of lecture hours in regular specialized colleges was higher than that in spare-time workers' colleges (about 10 per cent more). As the students were following 'half working, half studying' programmes, the workers' spare-time college did not offer physical education, and made more time for the technical component of the programme.

For the common courses offered in both colleges (Table 27) the number of lecture hours differed but slightly. The specific courses were completely different in the two colleges. The number of lecture hours devoted to specific courses was considerably lower in the workers' college (320 hours as compared to 478).

It should also be added that the students of regular specialized colleges were all residential, living at the college all the time. Students of workers' colleges had to travel to the colleges which were not necessarily in their neighbourhood. Table 28 shows the result of a survey of 307 graduates, all in the speciality of 'industrial electrical automation and electronics', in years 1981, 1982 and 1983. They came from the Shanghai Electrical Equipment Co-operative and the Workers' College of Shanghai No. 3 Steel Plant in 1981, 1982 and 1983. The table refers to the time they spent travelling to the college.

3. Graduation project and competency

As mentioned earlier, assessment of students was mainly done through a graduation project. As far as the selection of subjects for graduation projects is concerned, there were obvious differences between the two categories of colleges. In the regular colleges, the students had less contact

Table 27: The study programme in a workers' college and a regular vocational college

Courses	Total lecture hours: Shanghai Workers' College	Total lecture hours: Shanghai Textile College
Common courses offered in both colleges		
Political theory	240	218
Higher mathematics	270	292
General physics	240	182
Foreign language (English)	240	251
Principles of basic engineering	260	202
Pulse techniques	170	172
Transistor	160	179
Theory of regulation (automation)	80	64
Computers	160	160
Engineering drafting	108	136
Electrical control mechanics	80	176
Specific courses		
Semiconductor converter technology	60	-
Inspection and measurement techniques	80	-
Display techniques	80	-
Numerical control	80	-
Physical education	-	158
Chemistry	-	56
Automation of traction	-	184
Power supply	-	80
Total	2 278	2 510

with practical reality and they tended to choose general problems. It was not very easy for the graduates of regular colleges to show their real ability to solve practical problems. The workers' college graduates generally drew their project subject from production reality and usually after due consultation with the relevant factories. As a result, the range of problems selected was wider and more practical. On the whole, graduates of workers' colleges tended to display better ability in solving practical problems and familiarity with actual production.

Table 28: Travel time for students to attend college

	1 hr.	1-2 hrs.	over 2 hrs.
Shanghai Workers' Spare-Time College	61%	29%	10%
Workers' College of Shanghai Electrical Equipment Corp.	47%	35%	18%
Workers' College of Shanghai No. 3 Steel Plant	41%	43%	16%
Average for the three colleges	50%	35%	15%

For example, in a survey among the graduate projects taken from the speciality of 'industrial automation' in Shanghai Workers' Spare-Time College in 1981, almost all of them were problem-solving in nature and five of them were in fact put into practice. Only two projects were exploratory in nature. On the other hand, graduates from the same speciality of Shanghai Textile College in the same year proposed only two common projects for study. Both projects were simulation studies. The above comparison was only one on topics and not on achievements. The latter is difficult to compare.

However, both categories of colleges held similar views as to the way of assessing their graduates. They paid particular attention to the ability of the students to do independent work, the selection of appropriate research methodology, the prototype building or the software design, the quality of the final report and its oral presentation and defence in front of an examination jury.

B. Expenditures and costs

It is difficult to make rigorous and valid comparisons of expenditures and costs between the workers' colleges and the regular specialized colleges since there are so many variables which might influence the relative level of costs and expenditures. In addition, the limited number of cases at hand do not allow us to accommodate the vast variations among institutions.

It should also be pointed out that in recent years, with the conclusion of the Cultural Revolution and the re-adjustments which followed, enrolment increased quite rapidly, not only in the higher education system as a whole, but also in individual institutions. However, recurrent expenditures

have not grown as quickly as enrolment and the expenditure per capita has decreased. There have been signs that this is going to improve, but it is not sure how and when the improvement will come about.

For the municipality of Shanghai, the comparison between one workers' college and one regular specialized college is given in Table 29.

Table 29: Educational cost of a student

	Shanghai Workers' Spare-Time College			Shanghai Textile College		
Year	1978	1979	1980	1978	1979	1980
Recurrent expenditures ('000)	1 992	2 212	2 567	1 321	1 487	1 460
Total enrolment	2 247	4 014	4 504	522	1 004	1 348
Average expenditure per student/year	887	551	563	2 530	1 482	1 084

In both cases, enrolment more than doubled between 1978 and 1980 and the average expenditure per student decreased sharply. The level of expenditure, however, was much lower for the workers' colleges than for the regular specialized college. The same kind of evidence could also be found in the city of Dalian (Table 30).

The above comparisons suggest that the students of regular colleges were younger and had a more solid educational background, but they lacked the knowledge of the realities of production. They were weaker in practical experience and in the ability to solve practical problems. The students of workers' colleges had richer experiences of practical production and were better prepared to apply in practice what they learnt.

The difference between these two kinds of students was further accentuated during their study in the colleges because of the difference in patterns, contents, programmes and time schedules of teaching in the two categories of colleges. The students of regular colleges were residential, they had more time for study and could fully utilize the books and reference materials of the college libraries. They could also acquire tutorials from teachers when they needed it. The conditions for the students in workers' colleges were much less favourable, but they had a greater capacity to relate theory with practice, and this enabled them to study more efficiently and effectively.

Table 30: Recurrent expenditures per capita per annum in two workers' colleges and one regular specialized college in the city of Dalian (in yuan)

	College 1	College 2	College 3
1981	650	720	1 045.9
1982	600	437	1 573.4

College 1: Workers' College of Dalian Heavy Machinery Plant

College 2: Workers' College of Dalian Rolling Stock Plant

College 3: Dalian Railway College (regular specialized college)

Although the information available covers only a limited number of cases, it appears that the recurrent expenditures of workers' colleges were much lower than those of the regular specialized colleges, the per capita expenditure of the former being about half that of the latter.

II. Comparison of graduates

The comparison between graduates of workers' colleges and regular specialized colleges will be based on the information collected through a questionnaire applied to a representative sample of 800 graduates (graduating in 1981, 1982 or 1983) from the ten workers' colleges under survey and a sample of 200 graduates from four regular specialized colleges: The Dalian Railway Institute; The Shanxi Mining Institute; The Taiyuan Iron and Steel Vocational College; and The Shanghai Textile Vocational College.

The questionnaire covered the following aspects:

- the personal particulars of the graduates
- their educational profile before entering the college
- their working experience before entering the college
- their present occupation, work and responsiblity
- their level of salary

Details of the questionnaire are shown in Appendix A. Before proceeding with the comparison, we shall present some general information about the graduates of the workers' colleges.

A. Graduates of workers' colleges

As we have seen, workers who were admitted to a workers' college should have at least two years of working experience and have successfully passed the unified entrance examination. More specific information is given below.

1. Age

The distribution of graduates by age is shown in Table 31. More than 90 per cent of the graduates were in the 25-39 years age-bracket, and the proportion of those who were 40 years or older was very small.

Table 31: Age distribution of graduates under survey

	Number	%
Less than 25 years	28	3.5
25-39 years	337	42.1
30-34 years	242	30.3
35-39 years	155	19.4
40 or more	36	4.5
No reply	2	0.2
Total	800	100.0

2. Sex

Although there were female graduates in nearly all the workers' colleges (the only exception being the Taiyuan Mining College), the proportion of female graduates reached only 13.1 per cent (Table 32).

3. Place of birth

Most of the graduates were born within the province where the workers' college they attended was located. For the three provinces and the municipality of Shanghai in which the survey was conducted, the proportion born within the province was as follows:

Shanxi	74.5%
Liaoning	82.3%
Heilongjiang	86.6%
Shanghai	85.2%

Table 32: Participation of female graduates in the ten workers' colleges

	Male	Female	% female
Regional Workers' Colleges			
Shanghai Spare-Time College	53	7	11.4
Nanshi District Spare-Time College	85	12	12.7
Harbin Spare-Time College	245	34	12.5
Specialized Department Workers' Colleges			
Harbin Light Industry College	35	20	36.6
Shanghai Elect. Equip. College	50	12	18.9
Shanghai Steel Plant College	37	2	5.2
Factory-run Workers' Colleges			
Taiyuan Iron and Steel College	90	11	10.9
Dalian Heavy Machin. Plant College	30	2	5.6
Dalian Rolling Stock Plant College	26	5	16.7
Taiyuan Xishan Mining College	44	0	0.0
Total	695	105	13.1

Even if we narrow down to district level analysis, it appears that most of the graduates were born within the district where the college they were attending was located. In the case of the two workers' colleges of Harbin, for example, the distribution of graduates according to the district of birth is shown in Table 33.

In more general terms, if we take the ten colleges as a whole, we can say that most of the graduates were also born in an urban area. The proportion in fact reaches 85.9 per cent.

Table 33: Distribution of graduates by place of birth

District of Birth	Number of graduates	%
Harbin Municipality	251	74.9
Suihua District	9	2.7
Hejiang District	5	1.5
Mudanjiang District	4	1.2
Songhuajiang District	21	6.3
Sub-total	290	86.6
Districts outside the province	45	13.4
Total	335	100.0

4. Level of education

As can be expected, a large proportion of graduates of workers' colleges left secondary education many years before they were admitted to the colleges. In fact, half of the graduates left secondary education before 1970. The distribution of graduates according to the year when they left secondary schools is given in Table 34.

In order to be admitted to the workers' colleges, the workers should have completed senior secondary education. According to the survey conducted among the graduates, the level of education before admission to the workers' colleges was as shown in Table 35.

It would appear that a certain proportion of those admitted to the workers' colleges had completed junior secondary education. This may mean, however, that they had followed the remedial courses for adults in order to reach the level of senior secondary education. The unified entrance examination, however, guaranteed that all students of workers' colleges should have met the prerequisite conditions for receiving higher education.

Table 34: Year of completion of secondary education

	Number	%
1965 and before	102	12.0
1966-1970	314	39.3
1971-1975	250	31.3
1976 and after	126	15.0
No reply	8	1.0
Total	800	100.0

Table 35: Level of education before admission

	Number	%
Complete senior secondary	455	56.9
Complete technical secondary	52	6.5
Complete vocational secondary	56	7.0
Complete junior secondary	230	28.0
Other	7	0.9
Total	800	100.0

5. Working experience

To be admitted to the workers' college it is required to have at least two years of working experience. In fact, most students of workers' colleges had much longer working experience: about 70 per cent of them had worked for six years or more (Table 36).

Table 36: Distribution of graduates of workers' colleges according to working experience

	Number of years of working experience						
	2 years	3-5 years	6-10 years	11-15 years	16 years or more	Info. unavail.	Total
Regional Workers' Colleges							
Shanghai Spare-Time College	-	15.7	42.9	35.7	2.9	2.8	100.0
Nanshi Dist. Spare-Time College	7.5	13.7	32.1	24.3	1.8	9.7	100.0
Harbin Spare-Time College	10.1	21.7	37.0	20.2	3.9	7.2	100.0
Specialized Department Workers' Colleges							
Harbin Light Industry College	9.9	31.7	37.6	17.8	-	3.5	100.0
Shanghai Elect. Equip.College	7.7	23.1	40.4	23.1	-	5.8	100.0
Shanghai Steel Plant College	8.8	38.6	38.6	3.5	7.0	3.5	100.0
Factory-run Workers' Colleges							
Taiyuan Iron & Steel College	2.4	42.4	45.6	8.4	1.2	-	100.0
Dalian Heavy Mach. Plant College	5.6	44.4	38.2	11.8	-	-	100.0
Dalian Rolling Stock Plant College	5.6	44.4	38.2	11.8	-	-	100.0
Taiyuan Xishan Mining College	6.4	30.6	59.2	3.8	-	-	100.0
Total	7.0	25.5	40.3	18.3	3.4	5.5	100.0

6. Type of work before admission

Most of the graduates of the ten workers' colleges worked either in heavy or in light industry. The distribution by sector of activity is shown in Table 37.

Table 37: Graduates by sector of activity

	Number	%
Heavy industry	452	56.5
Light industry	272	34.0
Other sectors	76	9.5
Total	800	100.0

Before being admitted to the workers' college, most of the students were production workers, although a few were already cadres. Table 38 gives the detailed distribution.

B. Situation of the graduates

As indicated before, the questionnaire was applied to a sample of graduates from the workers' colleges and from the regular vocational colleges, in the consecutive years 1981, 1982 and 1983. Obviously, the situation changed in these three years. The 1981 graduates tended to be better off, because at the time of the survey they had already worked for three years after graduation. Hence, the year of graduation should be taken into consideration when any comparison is made.

Table 39 shows the posts occupied by the graduates. On the whole, graduates from regular specialized colleges were in slightly better positions than their counterparts in workers' colleges. A very large majority of them were assigned to engineer, assistant engineer or technician posts. None of them worked as production workers.

In the case of the graduates from the workers' colleges, there were significant differences between the three groups of graduates. Those who graduated in 1981 occupy higher positions. The proportion of engineers, assistant engineers, technicians and general cadres reached 75.4 per cent. There were still however 17.8 per cent who remained production workers.

Table 38: Type of work before admission

	Number	%
Responsible cadre	12	1.5
Science and technical cadre	28	3.5
Administrative cadre	37	4.6
Production worker	700	87.5
Others	23	2.9
Total	800	100.0

Note: Responsible cadre: Cadre higher than the chief of workshop, administrative or technical officer in the factories and enterprises.

Science and technical cadre : Technician, assistant engineer, engineer, professional researcher, etc.

Administrative cadre : Cadre working in the administrative offices of the factories and enterprises.

Production worker : Ordinary worker under the leadership of a team or group leader.

The situation of those who graduated in 1983 was far from being as good: 47 per cent of them were production workers and 33 per cent awaited new assignments. This might mean that some re-adjustments were being made within the enterprise in order to create the necessary conditions for the new graduates to be employed according to new qualifications. This adjustment process might take time.

From the evidence gathered in enterprises which employ both graduates of workers' colleges and regular colleges, it would appear that graduates of regular colleges were not very familiar with production practice and their ability to solve practical problems was not as strong as that of the graduates of workers' colleges. Their performance was therefore influenced by these factors at the beginning. But they posess stronger theoretical foundations and thus have greater potentials for further development. The graduates of workers' colleges had stronger abilities to solve practical problems and noticeably made achievements in research and innovation in a short time.

Table 39: Posts occupied after graduation

Type of post	Workers' College			Regular Vocational College		
	1981	1982	1983	1981	1982	1983
	Actual number					
Engineer	6	9	2	1	2	-
Assistant engineer	36	9	3	17	42	-
Technician	108	122	34	30	49	35
General cadre	28	15	7	4	2	2
Production worker	42	42	127	-	-	-
Situation not decided	9	-	89	1	-	-
Other	7	10	3	3	1	1
Total	236	207	270	56	96	38
	Percentages					
Engineer	2.5	4.3	0.7	1.8	2.1	-
Assistant engineer	15.3	4.3	1.1	30.4	43.8	-
Technician	45.8	58.9	12.6	53.6	51.0	92.1
General cadre	11.8	7.2	2.6	7.1	2.1	5.3
Production worker	17.8	20.3	47.0	-	-	-
Situation not decided	3.8	-	33.0	1.8	-	-
Other	3.0	4.8	1.1	5.4	1.0	2.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

For example, out of the 228 graduates who took the two specialities of 'machinery manufacture' and 'electrical automation' in Shanghai Nanshi District Workers' Spare-Time College and graduated in 1981, 1982 or 1983, 68 presented a total of 168 technical innovations. In the case of the 32 innovations whose economic values were innumerable, the increase in output amounted to 1,960,000 yuan per year.[14]

Out of a sample of 68 workers graduated from the Light Industrial College of Harbin Second Bureau of Light Industry in recent years, it was found that 39 accomplished 32 technical innovations, leading to an increase in output to the value of 1,490,000 yuan per year.

In the case of the Workers' College of Taiyuan Iron and Steel Company, the 42 graduates in the speciality of 'metallurgical machinery and equipment' in 1981 brought about 57 technical innovations, 3 of which won prizes either from the Science and Technology Committee of Shanxi Province or the Ministry of Metallurgical Industry. Graduates from Shanghai Workers' Spare-Time College and from the Workers' College of Dalian Heavy Machinery Plant made similar accomplishments.

[14] In Appendix B some examples of innovations introduced by the graduates of Shanghai Nanshi District Workers' Spare-Time College are given.

Part 4
Conclusions

I. The merits of the workers' colleges

The various analyses presented in this study tend to show that workers' colleges have played an important role in China. Their merits may be summed up as follows:

1. Workers' colleges are a means of improving the existing manpower

The worker's college is a form of in-service training. The entire student membership of workers' colleges are practising workers at all levels. The first and most important feature of the workers' college is, therefore, a means to improve the quality of the existing work force. As we have mentioned earlier, on the one hand, the education background of workers in China is comparatively weak; on the other hand, there is an acute shortage of technical and managerial personnel. To bridge this manpower gap becomes then a matter of crucial importance to sound economic development.

It is in this context that the workers' colleges play their role. In essence,the workers' college is a way of retraining and upgrading the existing work force. Compared with the conventional forms of higher education, it has the strength that the students are mature workers and are highly conscious of the relations between their study and their work. The effect of such retraining and upgrading is therefore almost immediate . In a way, it is a short-cut to reduce the pressure of manpower shortage which is less efficiently overcome by formal institutions.

2. Workers' colleges are sensitive to real manpower needs

This can be viewed from two angles. From one angle, workers' colleges are either operated by the production enterprises (as in the case of factory-run colleges) or operated to suit the demand of enterprises (as in the case of regional colleges). The curriculum and study programmes are designed to fit the manpower needs of the industries.

From another angle, the enterprises have the freedom to manoeuvre the modes of study in workers' colleges—full-time, part-time or spare-time—to fit the workers' studies into the manpower structures and production schedules. In the longer term, the enterprises may also use workers' colleges to tackle the imbalance in the qualification structure of the working force. Both points have significant implications in a planned economy. Under these circumstances, the enterprises may have a certain control in the planning of manpower for their own needs.

3. Workers' colleges provide a viable 'second route'.

In 1984, 40 per cent of Chinese workers had an educational background of junior secondary schooling and 20 per cent of senior secondary schooling. Many of these workers joined the working force during the Cultural Revolution (1966-1976) when higher education was not a commendable career.

In recent years, a large number of graduates from senior secondary middle schools or technical secondary schools have joined the industries. On the one hand, this has raised the average educational level of workers. On the other hand, there remains among these young workers an unsatisfied desire for further study. In fact, only 5 to 10 per cent of the graduates from senior middle schools (and around 3 per cent of the relevant age-group) have the opportunity to attend regular institutions for higher learning in the country.

Workers' colleges have helped to satisfy this desire. Workers' colleges lead to formal qualifications which carry the same recognition as those obtainable from regular colleges. They are not 'training' institutions in their usual sense. Therefore, while workers' colleges help to reduce manpower pressures in the community, they meanwhile provide 'second routes' for the young people to acquire higher education qualifications.

The total number of graduates from workers' colleges during 1978-1982 was roughly 591,600, i.e. around 59 per cent of the graduates from regular higher institutions during the same period. In 1985, the number of graduates from workers' colleges (260,211) was equivalent to 82.3 per cent of the number from regular higher education institutions (316,000).

4. Mobilization of local resources

The other merit of workers' colleges is seen in the mobilization of enterprise resources in the creation and operation of such colleges. It is noticeable that most of the funding of workers' colleges comes from enterprises which are then consumers of the retrained manpower. The funds from the enterprises in turn come from the budget item 'staff education'. There is therefore a built-in earmarked allocation of resources for staff retraining.

The factory-funded workers' colleges actually started a new mode of financing in education. More recently, enterprises do not only finance workers' colleges, but also finance commissioned-training in regular colleges. In financial terms, such commissioned-training is similar to the workers' colleges, because the enterprises pay and sometimes the trainees are practising workers. However, commissioned-training has created in regular universities a new financial situation whereby the regular universities may have some autonomy over spending this extra sum of income. In some of the newly emerging city-level universities, the largest part of funding comes from enterprises.

It is not exaggerating to say that the industrial enterprises have increasingly become a major contributor to higher education.

5. Efficient use of resources

Compared with regular institutions of higher education, workers' colleges have a much higher internal efficiency.

Factory buildings and workshops are used for training purposes. Machines and other equipment are also used for practical work. These have significantly minimized the funds which are needed to build additional classrooms and to purchase additional equipment for instruction. Student accommodations are usually not necessary because workers' colleges enrol non-residential students. In addition, the full-time teaching staff is usually comparatively small. Scientists and engineers working in the fields are invited as part-time teachers and the expenditures on staff are very much reduced. This is particularly so in China where the employing unit has to support comprehensive welfare facilities for its staff.

In addition, the large number of part-time and spare-time students incur minimal 'opportunity costs' in terms of forgone production time. Hence, the cost of training a graduate from a workers' college is much lower than that from a regular college at the same level. In sum, the workers' college needs smaller investments but leads to greater benefits.

II. Further development

It may be necessary to speculate at this point on some areas of further development for workers' colleges.

Firstly, although the study programmes in workers' colleges are geared to the specific professions in the field, such programmes largely conform to a unified curriculum over the entire country. On the one hand, this provides a viable means of 'quality control'. However, on the other hand, it lacks the flexibility to match the rapidly changing and widely varying scene in reality. It is broadly agreed that much can still be done to strengthen the workers' colleges. However, views are divided on the orientation of such a strengthening. Some argue for a further standardization of norms and regulations, i.e. more conformity. Others argue for more autonomy and flexibility. With the introduction of the overall reform plan in 1985, it seems that the latter is gaining ground. If regular institutions of higher education are moving away from conformity, it is envisaged that workers' colleges, which are supposed to be more sensitive to real needs, would have more flexibility to cater for specific needs.

Secondly, there is practically little difference in pedagogical terms between workers' colleges and colleges of equivalent standing. This is so both in terms of the teaching programmes as well as the teaching approaches and methods. On the one hand, this supports people's trust that workers' colleges are not 'second-rate' institutions. On the other hand, however, little attention is paid to the special needs and strengths of adult students. If special attention could be paid to students' professional and psychological characteristics, more flexible teaching methods and learning modes could be adopted. Little has been done, for example, to adapt teaching in workers' colleges to the motivations and experience of the worker students. On the whole, there seems to be in China a mismatch between the comprehensiveness of the adult education system and the lack of a 'pedagogy for adults'.

Thirdly, China seems to take a rather extreme stand in the controversy of specialization versus general training. As reflected in workers' colleges, study programmes are still extremely narrow in their scope. Studies in workers' colleges are very much 'vocational training' in its international

sense. Whether narrow 'vocational training' is appropriate at tertiary education level is debatable. This pertains to the philosophical point of the aims of higher education, but also to the very pragmatic point of whether such narrow training would meet the needs of modern technological change. However, this issue is seldom questioned in China, perhaps because most of the trainers were trained under a similar system.

Fourthly, although broadly speaking studies in workers' colleges are closely related to the reality on the job, the actual teaching makes little use of the work-place situations. The 'part-time' mode of study includes mainly a partition of time between study and work; it does not have the element of a 'sandwich' course which includes on-the-job experience as a component of study. Nevertheless, the graduate projects, as mentioned in this report, do relate to the students' jobs. More recently, on-the-job training has become a prevalent theme in workers' education. It is not sure yet what will be the relationship between the concept of on-the-job training and workers' colleges.

III. Postscript

This report is based on a survey carried out in mid-1983. The Chinese educational scene is changing so rapidly that much of what was true in 1983 soon became obsolete in 1986 when this report was being finalized. In particular, there has been a drastic reform in higher education that was officially endorsed in 1985. The reform has rendered what was exceptional flexibility in workers' colleges a common practice in most universities. On the other hand, there is again tremendous expansion in adult education as a whole. Independent study examination, for example, has become so popular that an 'open education' type of institution is going to add colour to the Chinese education system.

Given all this, the workers' college, as the Chinese version of staff development in a formal way, still has its very particular characteristics. Therefore, it is hoped that the account provided in this report will be useful to planners elsewhere.

Just before the editing of this report was about to finish, news came in with the most recent figures on adult higher education in 1986:

Number of adult higher education institutions	1 420
Number of workers' colleges	952
Enrolment of adult higher education	1 800 000

This is perhaps the most up-to-date information on workers' colleges in China.

Appendix A

Information collected through the common questionnaire applied to the graduates of the workers' colleges and the regular vocational colleges

A. Personal characteristics

- Sex
- Year of birth
- Province of birth
- District of birth
- Urban/rural area of residence
- Province of residence
- District of residence
- Urban/rural area of residence
- Sector of activity of father
- Occupation of father
- Sector of activity of mother
- Occupation of mother
- District of residence of parents
- Urban/rural area of residence of parents
- Type of work of spouse
- Occupation of spouse

B. Working experience

- Year of completion of secondary education
- Previous sector of activity
- Previous occupation

C. Educational level and salary before entering college

- Level of education
- Year of first employment before entering college
- Salary level before entering college

D. Type of occupation and change in salary after graduation

- Profession after graduation
- Type of work after graduation
- Occupation after graduation
- District where work unit is located
- Urban/rural area where work unit is located
- Salary level during schooling
- Salary level after graduation

Appendix B

Examples of innovations introduced by some graduates of Shanghai Nanshi District Workers' Spare-Time College

Name	Year	Innovation	Results
Ye Kemin	1981	Silicon-controlled rectifier	30% savings on electricity reduced production costs by 60,000 yuan
Gu Cun	1981	HD-45 Optical surface sclerometer HR-15ODT Automatic load and discharge sclerometer	Suitable for the measurement of surface hardness of hard metal
Zhai Zhiquan	1981	Three teaching models (space model of protein structure, molecular orbit and DNA structure)	Economic value of 780,000 yuan over two-year period
Xue Weijun	1982	New technology of direct processing semi-finished blank using numerical control line cut	Merged 20 working procedures into 1; prod. cost reduced 5.6%; Reject. rate cut 3.3 - 4.9%; 34 tons of stainless steel saved, amounting to 1,360,000 yuan

Wang Zhenghui	1983	'Car electric switch' 'Electrical machinery centrifugual switch', etc., more than 10 innovations in all	Output value making up more than 25% total output value of factory, amounting to 1,000,000 yuan per year
Song Tianmao	1983	New up-down turning chair	Net benefit of 28,000 yuan per year.

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